RESEARCH ARTICLE

MEDIA KONSERVASI
SCIENTIFIC JOURNAL IN CONSERVATION OF NATURAL RESOURCES AND ENVIRONMENT

Analysis of the Golden Ratio on Flowers as an Ecotourism Interpretation in Sukabumi Region

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Article Info:
Received 02 December 2023
Revised 11 June 2024
Accepted 18 December 2024

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Abstract

The beauty of flowers holds significant appeal for tourists seeking to experience nature. This aesthetic quality can be quantified using the golden ratio, a numerical value associated with beauty. Understanding the golden ratio in flowers offers a fascinating way to enrich ecotourism interpretations for both tourists and flower enthusiasts in Indonesia. This knowledge can transform how visitors appreciate the natural beauty around them. This exploratory research aims to determine the golden ratio's position in 150 flowers found in the Sukabumi Region. A quantitative approach is used to measure and analyze to obtain a comparison that produces a golden ratio value so that the aesthetic value of each flower found in the Sukabumi Region can be known. The results of the golden ratio values were found in nine different variations of the comparison between the morphologies. The golden ratio value on flowers can be used for ecotourism interpretation and adding knowledge regarding the importance of the value of beauty so that it can be managed as a source of tourist attraction in the Sukabumi area.

Keywords: aesthetics, ecotourism interpretations, flowers, golden ratio

1. Introduction

Flowers are widely recognized for their aesthetic value and beauty. This aligns with Chan [1] perspective that their inherent attractiveness makes them a symbol of beauty. Proof that flowers have beauty was stated by Hůla and Flegr [2] in which their research shows that there are many apartment and garden owners planting flowers, horticulturists striving to breed new types of ornamental flowers, and floral motifs found in paintings, fabrics, porcelains, or jewellery. Flowers play a significant role in tourism by drawing visitors who want to experience natural beauty. They also enhance the aesthetics of an area and can even be transformed into tourism products. The beauty of flowers is utilized in many tourist destinations to increase tourist attraction, such as flower festivals or gardens that tourists can visit.

Aesthetics can attract and impress tourists to visit a place, which can make them return in the future and help build a positive image of a tourist destination. Photography is a powerful way to create a positive image that attracts tourists. This can be seen in the habits of tourists nowadays, who always capture moments while traveling by taking pictures or photos of places or objects that have beauty or aesthetic value.

Measuring beauty is subjective and difficult because every individual's perception of beauty may vary. Beauty can be assessed using the golden ratio, a number considered to possess inherent aesthetic value. The golden ratio, or the Fibonacci ratio, compares mathematical proportions between two numbers or objects considered visually and aesthetically proportional. The golden ratio number equals 1.618 or approximately 0.618. People often refer to it as the divine ratio or the golden. The ratio has been widely used in architecture and various other fields.

Knowledge about the golden ratio on flowers can be used to interpret flowers. It can also be a tourist attraction because it can be interesting information for tourists. Objects with a golden ratio have unique characteristics that enhance the perception of an interesting travel experience. The broader implications of the golden ratio findings are that they support the relevance of nature as part of a variety of human cognitive behaviors [3]. Therefore, the golden ratio as a symbol of beauty can convey an important message for tourists. The aim is to help tourists better understand the beauty of each flower they encounter during their tour in the Sukabumi Area.

2. Materials and Methods

2.1. Research Location

The research took place in Sukabumi, specifically within the conservation areas of Gede Pangrango National Park, Halimun Salak National Park, and Ciletuh-Palabuhanratu Geopark, as well as places like roads lined with flowers all the way and ornamental flower sellers in Sukabumi. The locations were chosen based on where the flowers grew when the research data was collected as can be seen in Figure 1.

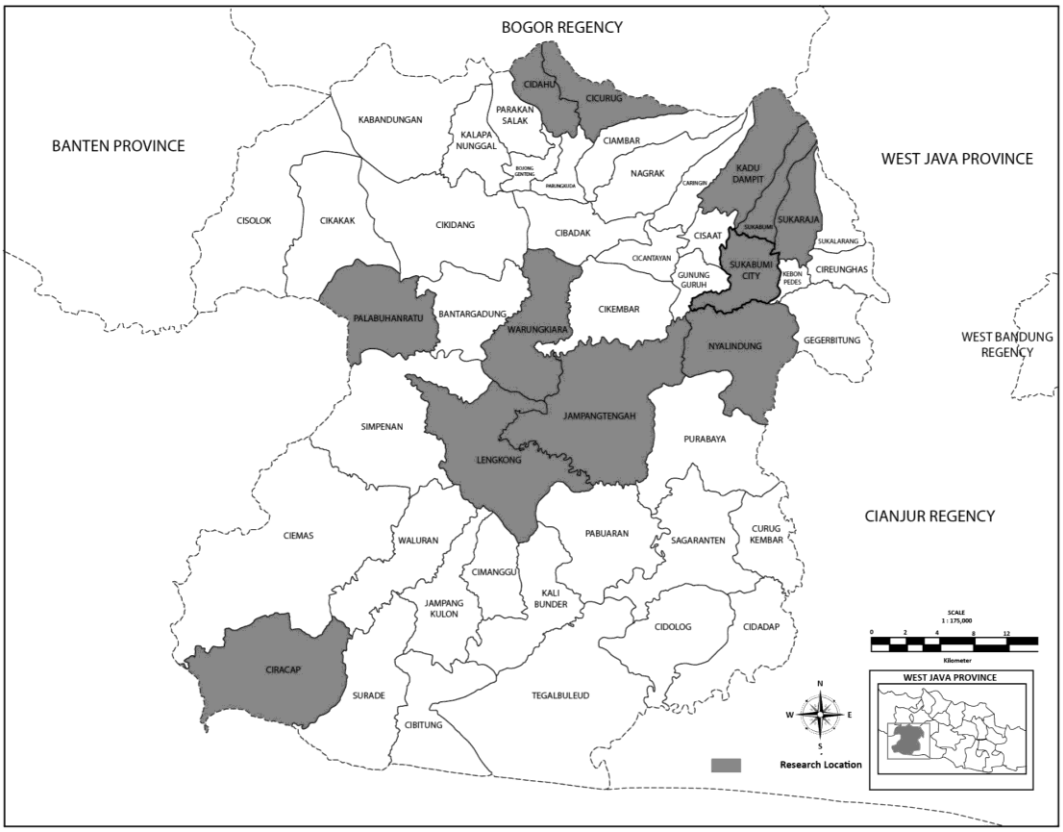


Figure 1. Research location.

2.2. Methods

This exploratory research aims to find out about the location of the golden ratio in 150 flowers in the Sukabumi Region by observing, measuring, and documenting flowers at the research locations. This research uses a quantitative approach to measure and analyze flowers from the Sukabumi region, aiming to determine their golden ratio values through comparison. Samples were obtained through purposive sampling, a method where selection is guided by certain criteria. This study's criteria included various flower types, mirroring previous research conducted in Bogor, Indonesia. 150 flowers were used as the objects of this study.

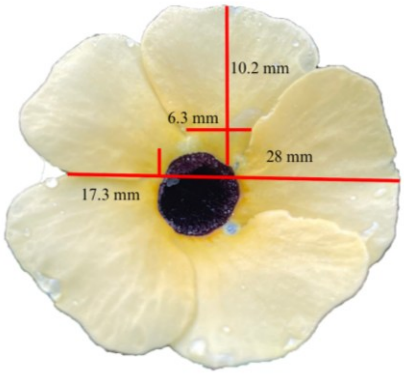
The research data collected include primary and secondary data. Secondary data was obtained by conducting literature studies on flowers that grow in the research location, including taxonomy for categorizing flowers based on families. After obtaining secondary data, primary data was collected by collecting the flower sizes and visually documenting the flowers. The flowers' sizes include the petals, corolla, stalk, and overall height, measured using a caliper, while the pictures of the flower were taken using a camera.

The first stage involves collecting secondary data through a literature study on flowers that grow in the Sukabumi region. The literature study serves as the basis for identifying the types of flowers that would be the research objects; taxonomy is used to categorize flowers by family. Information obtained from the literature study makes it possible to comprehensively understand the characteristics of each family of flowers, including the general traits, characteristics, and benefits. After collecting the secondary data, the next stage is collecting the primary data. Primary data includes direct measurement of the physical characteristics of each flower in the Sukabumi Region. The measured parameters include the size of the petals, corolla, peduncle, and overall height of the flowers. These measurements were taken using a vernier caliper. In addition, visual documentation of each flower was done by taking pictures using a camera.

2.3. Data Analysis

The collected data were then converted into digital form to facilitate the analysis of the golden ratio proportion. The golden ratio was calculated by observing the morphology of each flower, including comparing the width and height of the petals and the overall size of the flower. These measurements were then compared using the golden ratio formula.

In this study, a flower is considered to have a golden ratio if the measurement of its height, length, width, and object area can be divided, resulting in numbers close to 1.618 and 0.618. The golden ratio is defined as the result of dividing the sum of two numbers (e.g., a + b) by the larger number (b), which is equal to the result of dividing the larger number (b) by the smaller number (a) as can be seen in Figure 2 [4].



the total width of the flower and the receptacle

$$\frac{28\ \text{mm}}{17.3\ \text{mm}} = 1.618$$

the length and width of the petal

$$\frac{10.2\ \text{mm}}{6.3\ \text{mm}} = 1.618$$

Figure 2. The golden ratio on flowers.

The applications used to analyze the data in this study are Adobe Photoshop and ImageJ. Adobe Photoshop is used to visualize the size and location of the golden ratio on flowers. The tools used in Adobe Photoshop are ruler and line tools. The ruler is used to view the measurement results on the object, while the line tools provide a visual representation of the size and location of the golden ratio of the flower. ImageJ is used to produce the results in the form of a comparison of the area of the flower.

3. Results

3.1. Golden Ratio on Flowers

The research found that Apocynaceae was the most prevalent flower family, containing 11 species. Asteraceae came next with 10 species, while Acanthaceae and Rubiaceae each had 9 species The results show that all the flowers included in the research were found to exhibit

the golden ratio (1.618) or a closely approximated value, specifically between 1.612 and 1.633. The difference in the numbers collected from these flowers has various factors. Primarily, larger flowers have a golden ratio of 1.618 compared to smaller flowers. This is because the golden ratio number with a value of 1.618 has 3 digits behind the comma, while the research measuring tool only reaches one number behind the comma. The weakness of the tool makes the value resulted in value only close to 1.618.

The diverse morphology of flowers causes the golden ratio results to be found in varying parts. Flower size and symmetry can vary due to factors like ecological consistency and the types of pollinators involved. The analysis identified nine golden ratio relationships within the flowers studied. The golden ratio on flowers was found in the ratio between (1) the total area and the partial area of the flower; (2) the length and width of the petal; (3) the total width of the flower and the receptacle; (4) the total height of the flower from the petal to receptacle; (5) the width and height of the receptacle; (6) the total area including the inner petal area; (7) the flower height and pattern width; (8) the petal height and pattern height on petals; (9) the flower height and flower radius. Figure 3 below is a picture showing the number of flowers based on position of the golden ratio found in the objects of this study.

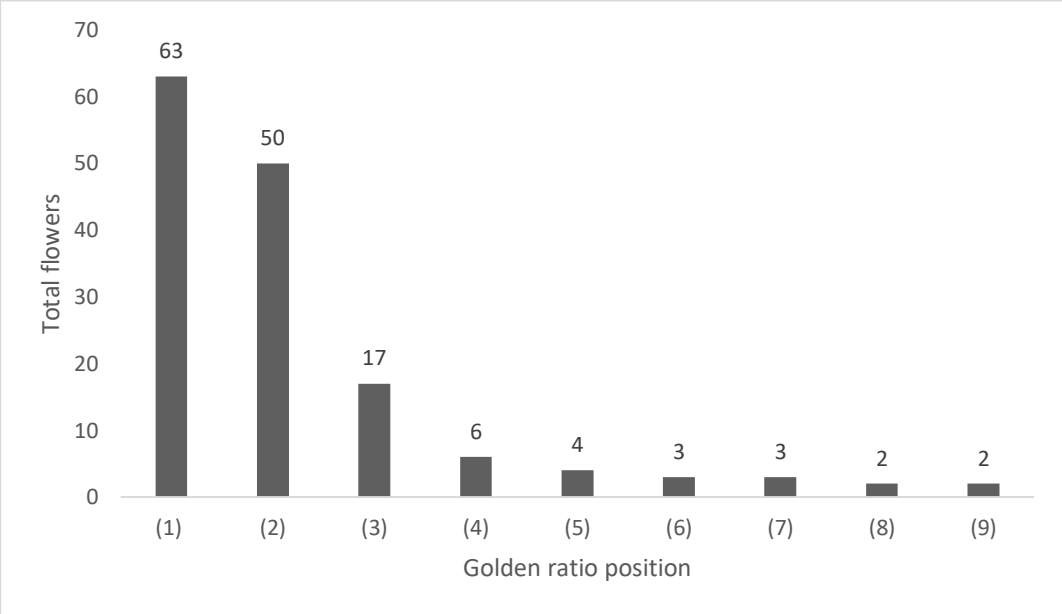


Figure 3. Total flowers based on golden ratio position.

The golden ratio was predominantly found in the comparison of flower areas within this research. The analysis results using ImageJ show that comparing the total area of flower petals with the area of some flower petals can produce a golden ratio number in the flowers studied. The golden ratio, when applied to area comparisons, was found in 63 of the flowers. The golden ratio in area comparison was observed in flowers with 5 petals when compared to those with 3 petals. Results were also found in the area of flowers with a petal count of 3 compared to the area of the 2 petals as can be seen in Figure 4. Examples of area comparisons can be seen in the flowers *of Oxalis debilis* and *Tradescantia pallida.*

(a) (b)

Figure 4. Position of the golden ratio on the area of *Oxalis debilis* (a) and *Tradescantia pallida* (b).

The discovery of the golden ratio on flowers with petal counts of 5 and 3 with the comparative area found in petal counts of 3 and 2 shows that petals with counts of 5, 3, and 2 are related to Fibonacci numbers. This discovery indicates that the golden ratio is strongly related to Fibonacci numbers, which can be identified in the patterns of petals as a symbol of beauty and harmony [3,5]. In *Oxalis debilis* flowers, the ratio between the total area with five petals compared to the area of the petals is 297.912 mm/184.12 mm, resulting in a value of 1.618. Flowers *Tradescantia pallida* has a total area of three petals compared to its partial petal area of 244.066 mm/150.841 mm, resulting in a value of 1.618.

The golden ratio has been applied to analyze the proportions of natural elements, such as flower petals [6]. The golden ratio in this study is also found in the ratio between the length and width of the petals. The golden ratio was identified in 49 flowers, making it the second most frequent position where the golden ratio was found in flowers. When comparing the length and width of the petals, some flowers with a golden ratio are *Commelina diffusa*, *Scaevola taccada*, *Calotropis gigantea*, and *Cleome rutidosperma* as can be seen in Figure 5.

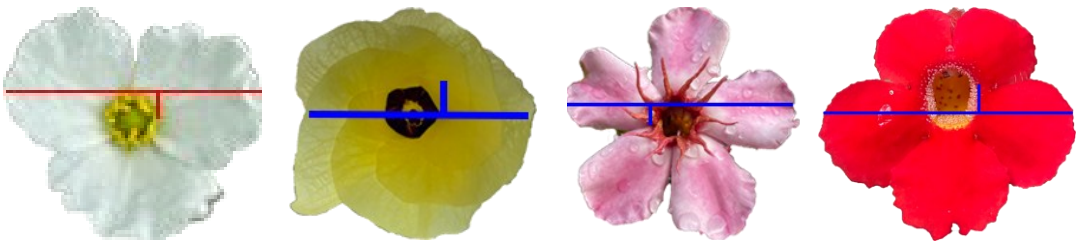
In *Commelina diffusa* flowers, the ratio found in one of the petals is 14.1 mm/8.7 mm with a result of 1.620. In *Scaevola taccada* flowers, the ratio of length and width on one of the petals is 8.5 mm/5.3 mm, which results in a value of 1.619. In one of the *Calotropis gigantea* flower petals, the ratio between the length and width of the petals is 11.4 mm/7 mm, which results in a value of 1.628. In *Cleome rutidosperma* flowers, the ratio of the length and width of the petals is 6.7 mm/4.1 mm, which results in a value of 1.618.

(a) (b) (c) (d)

Figure 5. Golden ratio in the petals of *Commelina diffusa* (a), *Scaevola taccada* (b), *Calotropis gigantea* (c), and *Cleome rutidosperma* (d).

The other golden ratio is found in the ratio between the total width of the flower and the width up to the stamen and pistil, also known as the receptacle [7]. The golden ratio observed here aligns with the theory that it appears when a line is divided into two unequal segments. In such cases, the ratio of the longer segment to the shorter segment is equal to the ratio of the total length to the longer segment [8]. This position has a total of 17 golden ratio and is the third most common in this study. In this position, flowers with a golden ratio are *Sagittaria latifolia*, *Taliparitti tiliaceum*, *Strophantus gratus*, and *Episcia cupreata* as can be seen in Figure 6.

In *Sagittaria latifolia* flowers, the results of the measurement are 28.2 mm/17.4 mm from which a value of 1.620 is resulted. In *Taliparitti tiliaceous* flowers, the results of the measurement are 54.3 mm/33.5 mm, from which a value of 1.620 has resulted. In *Strophantus gratus* flowers, the measurement results are 67.4 mm/41.6 mm, from which a value of 1.620 is obtained. In *Episcia cupreata* flowers, the measurement results are 20.1 mm/12.4 mm, a value of 1.621.



(a) (b) (c) (d)

Figure 6. Golden ratio in the comparison of width ratio of *Sagittaria latifolia* (a), *Taliparitiliaceum* (b), *Strophantus gratus* (c), and *Episcia cupreata* (d).

Another golden ratio is found between the flower's total height and receptacle height. This aligns with the theory that the golden ratio is determined by dividing lines, appearing as the ratio between the longer and shorter segments. [9] The research identified six flowers possessing a golden ratio in this position. Some examples of the flowers are *Ipomoea mauritiana*, *Echinodorus cordifolius*, *Begonia muricata*, and *Taraxacum officinale* as can be seen in Figure 7. In *Ipomoea mauritiana* flowers, the measurement results are 60 mm/37 mm, resulting in a value of 1.621. In *Echinodorus cordifolius* flowers, the results of the measurement are 24.7 mm/15.2 mm which results in a value of 1.625 is resulted. In *Begonia muricata* flowers, the measurement results are 22.6 mm/13.9 mm, resulting in a value of 1.625. In *Taraxacum officinale* flowers, the results of the measurement are 30 mm/18.5 mm which results in a value of 1.621.

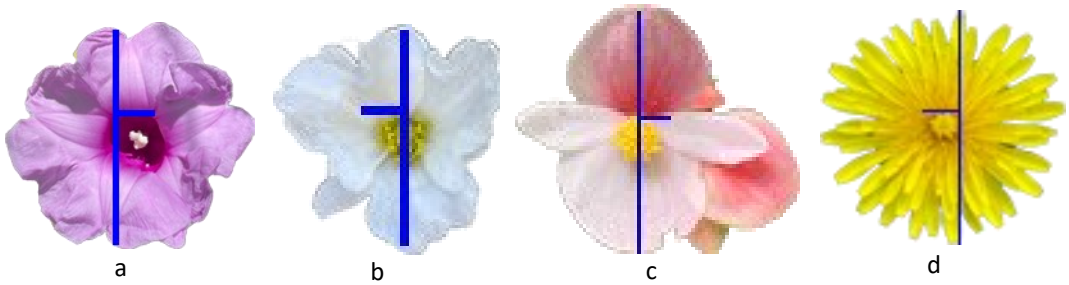


Figure 7. Golden ratio in the height comparison of *Ipomoea mauritiana* (a), *Echinodorus cordifolius* (b), *Begonia muricata* (c), and *Taraxacum officinale* (d).

Another golden ratio is found in the position of the comparison between the width and height of the receptacle. This aligns with the theory that the golden ratio's proportion is a comparison between two cross-sections of a line or two dimensions of a plane figure where the smaller part of the two dimensions is in proportion to the larger one. In comparison, the larger part is proportional to the sum of the two [10]. In this position, the golden ratio is found in four flowers: *Ruellia tuberosa*, *Pandorea jasminoides*, *Cyrtandra picta*, and *Strobilanthes* sp. as can be seen in Figure 8. In *Ruellia tuberosa* flowers, the measurement results are 11.3 mm/7 mm, from which a value of 1.614 resulted. In *Pandorea jasminoides* flowers, the measurement results are 10.7 mm/6.6 mm, from which a value of 1.621 resulted. In *Cyrtandra picta* flowers, the measurement results are 10.6 mm/6.5 mm, with a value of 1.630. In *Strobilanthes* sp. flowers, the measurement results are 4.2 mm/2.6 mm, from which a value of 1.615 results.

Figure 8. The golden ratio in the comparison between the width and height of the receptacle of *Ruellia tuberosa* (a), *Pandorea jasminoides* (b), *Cyrtandra picta* (c), and *Strobilanthes* sp. (d).

The golden ratio is consistently present in the pattern and arrangement of flower petals [3,4,11,12]. A clear example from this study is the golden ratio found between the area of the entire petal and the area of the inner petal of the flower. This golden ratio is found in *Hemerocallis envious* and *Ixora crimson star* as can be seen in Figure 9. Compared to the inner area of the flower, *Hemerocallis envious* has a total area of 7,749 mm/4,788 mm, resulting in

a value of 1.618 and *Ixora crimson star* has a total area of 43.33 mm/26.77 mm, which also yields a value of 1.618.

(a) (b)

Figure 9. The golden ratio of the comparison between the outer and inner petal area ratio is *Hemerocallis envious* (a) *and Ixora crimson star* (b).

A flower's patterns can enhance the beauty of floral arrangements. These patterns often boast bright, appealing colors that boost an object's or space's visual appeal. The flower's geometric model directly generates these patterns. The varying color combinations in floral patterns create harmonious and visually pleasing effects [13]. The golden ratio is found in the height to width of the *Costus afer* Ker Gawl and *Stokesia laevis pattern* as can be seen in Figure 10. The *Costus afer* Ker Gawl flower pattern height is 13.7 mm with a pattern width of 8.5, which, when compared, results in a value of 1.611. *Stokesia laevis* flowers have a flower height of 63.1 mm with a pattern width of 38.9 mm, so when compared, it resulted in a value of 1.622.

(a) (b)

Figure 10. Golden ratio of the comparison between the height and width of the pattern in *Costus afer* Ker Gawl (a) *and Stokesia laevis* (b).

Bright-colored dots, stripes, and motifs on flowers are the ornaments of most flower crowns. These ornaments play an important role in biological interactions and environmental factors. Patterns on petals are multifunctional. For example, they help pollinators communicate, mediate interactions between herbivores, protect flowers from UV radiation, or increase desiccation resistance [14].

The golden ratio of a comparison between the height of the petal and the pattern of the petal height is found in *Iris domestica* and *Plumbago auriculata* as can be seen in Figure 11. The discovery of the ratio of the pattern shows that patterns on plants have aesthetic value that adds to the visual element of its beauty. This aligns with the idea that the golden ratio represents the pinnacle of aesthetic value for human perception. It's evident in various natural phenomena, including the body proportions of diverse organisms, plant growth patterns, insect structures, and even cosmic models [15]. A comparison of one of the petals of *Iris domestica* shows the number 25.8 mm/15.9, so the result is a value of 1.622. In *Plumbago auriculata* flowers, the petal height is 25.8 mm with a pattern height of 15.9 mm, so when compared, the result is a value of 1.628.

(a) (b)

Figure 11. Golden ratio of the comparison between the petal height and the pattern height in *Iris domestica* (a) and *Plumbago auriculata petals* (b).

The petals of numerous flowers display the Fibonacci sequence and the golden ratio, both of which are mathematical principles observed in nature. In plants, the golden ratio commonly appears from leaf arrangement to petal patterns [3]. In *Ludwigia peruviana* and *Althernanthera philoxeroid*, the golden ratio is found in the height and radius of the flower as can be seen in Figure 12. The measurement results of the height of *Ludwigia peruviana* is 18.3 mm with a radius of 11.3 mm, so when a comparison is made, a value of 1.619 resulted. *Alternanthera philoxenia* has a height of 4.9 mm with a radius of 3 mm; when a comparison is made, several 1.633 resulted.

(a) (b)

Figure 12. Golden ratio compares the height and radius ratio of *Ludwigia peruviana* (a) and *Althernanthera philoxeroid* (b).

4. Discussion

4.1. Flowers as Tourist Attraction

The golden ratio serves as a key indicator for assessing the beauty of various flower structures. The presence of beautiful structures built on the golden ratio suggests that it plays a part in the development of consciousness and contributes to the aesthetics of flowering plants [16]. This phenomenon illustrates that the golden ratio is not just a mathematical theory but also has implications in creating attractive visual harmonies on flowering plants and thus has great potential to increase aesthetic appeal, especially when applied in the context of tourist attractions that can draw visitors' attention.

The results of the literature study show that flowers found and scattered in the Sukabumi Region can be utilized as objects of tourist attraction, especially those that grow in conservation areas such as in Gede Pangrango National Park, Halimun Salak National Park, and Ciletuh-Palabuhanratu Geopark (Figure 13). One of the activities that can be carried out concerning tourism in conservation areas is to create educational tourism programs and conduct training for tour guides on flora interpretation to increase the attractiveness of tourism in conservation areas [17].

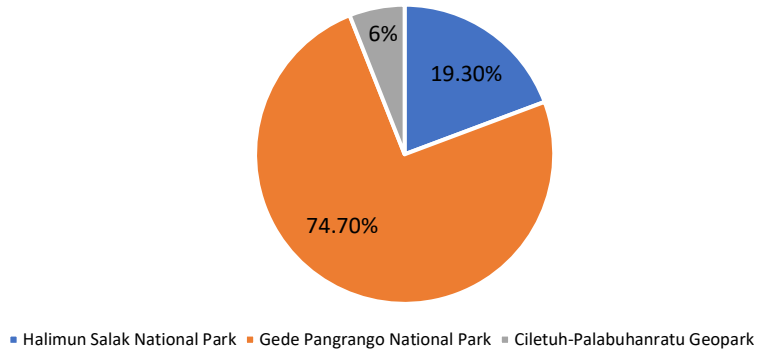


Figure 13. Flowers location.

Ornamental plants can serve as a tourist attraction due to their beauty. Besides ornamental plants, medicinal plants found in this study also have a golden ratio value as a symbol of aesthetics or beauty. As stated earlier, beauty can be a tourist attraction, which also applies to medicinal plants' beauty. In addition to enjoying visual beauty, the benefits of medicinal plants can also function as a tourist attraction. Research by Ratknić [17] suggests that responsibly using medicinal plant resources can boost tourism and, in turn, help develop rural areas. For example, tourists can visit famous villages that traditionally utilize medicinal plants, and from these visits, they will learn about the plants' practicality [18]. In addition, medicinal plants can also be a promotional element in tourism, such as utilizing them in the promotion of herbal tourism or spas that use natural ingredients. Thus, tourist spots with medicinal plants as attractions also act as an educational tool that will enrich visitors' knowledge.

4.2. Ecotourism Interpretation of the Golden Ratio on Flowers

Knowledge about the golden ratio in flowers can serve as a valuable resource for ecotourism interpretation. This is because the golden ratio has a scientific basis. The golden ratio is derived from mathematical calculations of proportions that earlier researchers deemed beautiful and harmonious. The golden ratio has been explored and applied across diverse scientific disciplines, such as mathematics, physics, biology, and art [19,20]. This information can therefore serve as an educational guide or a source of ecotourism knowledge, enhancing visitors' understanding of the relevant tourist destinations.

Interpretation is not only an educational medium but can be a tool to support conservation efforts in a region. This aligns with Widodo *et al*. [21] view that creating cultural and natural interpretation programs not only boosts the well-being of local communities but also strengthens conservation efforts, ultimately leading to a higher quality of culture and nature. In addition to providing insight to local communities, it inspires a sense of responsibility and belonging to their cultural and environmental heritage.

As a tourist attraction, it would be better if the flowers in the Sukabumi region were provided the interpretation of them for tourists to read. Interpretation is important in providing a good experience for tourists. Paiva [22] states that gardens, including flower festivals and exhibitions, have great tourism potential and can offer unique experiences that contribute to a nation's memory and identity. Therefore, tourist interpretation can help tourists understand and appreciate the attractions they visit. Walker [23] research indicated that through interpretation, people's sustainability-related values, beliefs, attitudes, and actions can be activated or modified, applicable to the place they visit and elsewhere. Powell [24] research indicates that effective and well-executed interpretation during ecotourism experiences can enhance visitors' understanding of protected areas, foster supportive attitudes towards their resource management challenges, encourage environmentally friendly behaviors, and promote financial contributions to conservation efforts.

Ecotourism interpretation is related to managing the location where flowers grow by creating an interpretation program at the location where the flowers grow. Masberg [25] suggests that incorporating information on sustainability gathered from ecotourism into the interpretation planning process can provide information for developing interpretation

programs, program evaluation, identifying content needs for specific visitor groups, or as a method for formalizing decision-making and prioritizing interpretation content. Overall, interpretation is a key tool for sustainability promotion and conservation in ecotourism. Thus, displaying interpretations of the golden ratio on flowers in the Sukabumi region for tourism purposes has a role in increasing understanding, appreciation, and support for sustainability and conservation, as well as influencing tourists' attitudes and actions regarding environmental issues at the spots also as a planning program in ecotourism marketing.

Information about the golden ratio in flowers would make an excellent subject for an interpretation program. This is because it's a novel discovery that can help visitors truly appreciate the beauty of flowers. The research results of Hula and Flegr [2] show that the shape and color of flowers are the important criteria for defining the beauty of flowers. Symmetrical shape is the type of shape preferred by the respondents. This shows that humans like flowers that have a symmetrical shape, with golden ratio analysis can objectively show the flowers' appraisal. This research found that flowers in the Sukabumi area have various forms of symmetry. This study found the largest flowers in the radial group 88. A total of 31 types of flowers are included in the bilateral group and 31 in the asymmetric group.

One of the interpretations that can be shown about flowers that have the golden ratio is in terms of plant or ethnobotanical benefits. Ethnobotany, which includes knowledge about the relationship between humans and plants, has great potential for educational and in-depth interpretation. This information is important in exploring local culture and wisdom and understanding how people rely on plants for various purposes, such as food, medicine, and religious rituals. For example, the Biduri flower (*Calotropis gigantea*) is used in the tradition of 7 months of pregnancy [17]. Several food plants that are vegetables commonly consumed freshly by Sundanese people were also found in this research, including eggplant (*Solanum melongena*), cosmos (*Cosmos sulphureus*), turkeyberry (*Solanum torvum*), bitter melon (*Momordica charantia*), and chayote (*Sechium edule*).

Apart from being consumed, the other benefits of the plants found that are used directly by the community are as the ingredients of natural dyes and natural fragrances. Some of the flowers found that can be used as natural dyes are *Commelina diffusa* and *Plumbago auriculata,* which can produce a natural blue color from the extraction of the flowers. Meanwhile, jasmine (*Jasminum coarctatum*) and lemon (*Citrus limon*) flowers are used as aromatic base ingredients. The knowledge about ethnobotany can be interesting information for ecotourism interpretation so that tourists gain a complete understanding of the meaning of the flowers, apart from their beauty, as well as the benefits utilized by the local community.

The golden ratio in flowers is a great topic for an ecotourism interpretation program. It's a new discovery that can really help tourists grasp the beauty of flowers. Tourists will come to understand the golden ratio in flowers as a manifestation of truth from an Islamic perspective, as presented in the Al-Qur'an in Surah Al Mulk (67) verse 3, which states that all of God's creations are mutually compatible and balanced.

Based on the description above, the important points need to be known about the golden ratio on flowers as information on ecotourism interpretation for tourists and the wider community include: 1) The golden ratio that can be a way to objectively appraise the beauty of flowers because it is seen from a balanced composition of patterns and sizes; 2) Observing the golden ratio in nature created by God which can help tourists connect more with the environment and their creator; 3) Understanding the golden ratio which can help visitors appreciate the beauty of nature in a new way, namely knowing the harmonious proportions of forms created in nature; 4) Understanding the golden ratio that can help photography enthusiasts to better organize the composition of natural photos to be taken so as to create more aesthetic and attractive outcomes; 5) Introducing the concept of the golden ratio which can be an interesting narrative by describing how the principle of the golden ratio is found in nature so that it can add to the travel experience through a narrative dimension; 6) Flowers with golden ratio that are not only beautiful, but also have various benefits which can provide additional information for tourists.

5. Conclusions

The results of the analysis of the flowers found in Sukabumi show that each flower has a golden ratio value. Among the flower families examined in the literature review, Apocynaceae contained the most species, totaling 11. The golden ratio value is found in 9 different variations of the comparison between the morphologies. Flowers' beauty can provide benefits visually and through educational dimensions, potentially becoming one of the driving factors for ecotourism. The golden ratio found in flowers offers a unique source of information for ecotourism interpretive programs. Flowers in the Sukabumi Region could become tourist draws, especially in conservation areas like National Parks, Geoparks, or Nature Tourism Parks. Beyond attracting visitors, some of these flowers also have commercial potential as ornamental plants.

Author Contributions

RFH: Conceptualization, Methodology, Investigation, Writing - Review & Editing; **RA:** Supervision; **TS:** Supervision.

Conflicts of Interest

There are no conflicts to declare

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