

FLORA SPECIES ASSESSMENT IN CENTRAL CEBU PROTECTED LANDSCAPE – DANAOS AREA: QUADRAT METHOD

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Received: 2024-05-29

Accepted: 2024-06-30

Published online: 2024-09-20

Abstract

The flora species assessment conducted in the Central Cebu Protected Landscape in the Danao Area utilized the quadrat method to investigate the living organisms in this ecologically significant region. This study aimed to provide information about species distribution, richness, and diversity to inform conservation strategies and management methods. Significant data were gathered by conducting systematic surveys of flora species and monitoring interactions among quadrats to improve the understanding of the area's flora species. The approach involved establishing ten square sampling sites at random locations in Barangay Licos, Danao city, within the CCPL, with each quadrat having a size of 2x2 meters. GPS-enabled smartphone apps were used to ensure a uniform sample across the study region. The researchers carried out a thorough assessment by prioritizing minimal invasiveness and acquiring relevant permits, which will guide future studies and conservation projects. The findings showed the wide range and complexity of the 3,120,000 estimated population of flora in the protected area, highlighting the importance of ongoing monitoring and conservation efforts to preserve the ecosystem. Overall, the detailed findings and data gathered from this flora species assessment provide significant data on the inventory of species found in the Central Cebu Protected Landscape, helping to preserve the region's unique natural heritage.

Keywords: Licos, species distribution, diversity, conservation, plant inventory.

1. INTRODUCTION

Biodiversity, the variety of living species on Earth, is crucial for maintaining the health and balance of ecosystems^[3]. Although the Earth's biodiversity is so rich that many species have yet to be discovered, many species are on the verge of extinction as a result of human actions, jeopardizing the planet's amazing biodiversity.^[2]

In the Philippines, the Central Cebu Protected Landscape (CCPL) is an important biodiversity zone in the Central Visayas region due to its high endemism.^[1] It was officially declared a protected area through Republic Act No. 9486 in 2007. The CCPL spans multiple municipalities, including Cebu City, Toledo city, Talisay city, Minglanilla, Balamban, Compostela, Liloan, Consolacion, and Danao city.^[7] This protected landscape is renowned for its rich flora species, acting as a vital sanctuary for various species of flora and fauna, many of which are endemic to the region.

The Danao area, which is part of the CCPL, is particularly noteworthy because of its distinct geographical features and potential for high biodiversity.^[6] Three barangays

in the municipality of Danao Cebu are under the jurisdiction of the CCPL. One of these, Barangay Licos, has distinct features that add to the area's biodiversity and ecological significance. Licos, like the other barangays in the CCPL, is critical to maintaining the balance of the protected landscape.

The rich flora of the Central Cebu Protected Landscape in Danao reflects a valuable natural legacy that must be carefully monitored and managed. This study indicates the use of the quadrat method as a systematic technique to evaluate living creatures in this unique habitat. Using this strategy, researchers may collect useful data on species distribution, abundance, and diversity, which will help to support regional conservation efforts.

Assessing an area's biodiversity is critical to understanding its ecological significance and creating successful conservation strategies.^[5] The quadrat method is a common methodology for surveying and counting the diversity of living creatures in a given area.^[4] Researchers can collect representative samples of flora species in a given ecosystem by placing quadrats at random and recording the species found.^[8]

The Central Cebu Protected Landscape in the Danao area provides a unique opportunity to use the quadrat method to quantify flora species in this ecologically vital region. This study intends to provide significant insights into the living species that live in this area by expanding on prior research findings and adapting approaches to the local context. Understanding ecosystem composition and behavior is critical for designing successful conservation methods that support biodiversity management under growing environmental constraints.

Finally, this study aims to add to the growing body of information on flora species assessment, specifically in flora and its estimated population, by focusing on the Central Cebu Protected Landscape in the Danao region. The quadrat method allows researchers to methodically examine live organisms in this region, revealing their distribution, abundance, and variety. This study will also help to support conservation efforts and promote sustainable management of natural resources in Central Cebu, thereby contributing to the preservation of the region's unique biodiversity in the future.

2. MATERIALS AND METHODS

The study will take place in a barangay of Danao city that falls under the Central Cebu Protected Landscape (CCPL), which is Barangay Licos (Figure 1). We used the quadrat method to survey the flora of each location. This method involves setting up 10 square sampling sites at random locations inside the specified barangay in Danao city under the CCPL. Using a tape measure, the dimensions of each quadrat were 2x2 meters. To calculate the random placements of each quadrat, we employ a GPS-enabled smartphone app. This approach will provide the longitude and latitude coordinates for each quadrat, ensuring that the sampling effort is divided evenly across the study region. During data collection, we recorded every interaction with plant

species within each quadrat, as well as the number of each organism. Prior to data collection, the researcher obtained the necessary permits from the Danao City government and CCPL management. Finally, minimal invasiveness should be prioritized throughout the data gathering procedure to safeguard the fragile environment within the protected region.

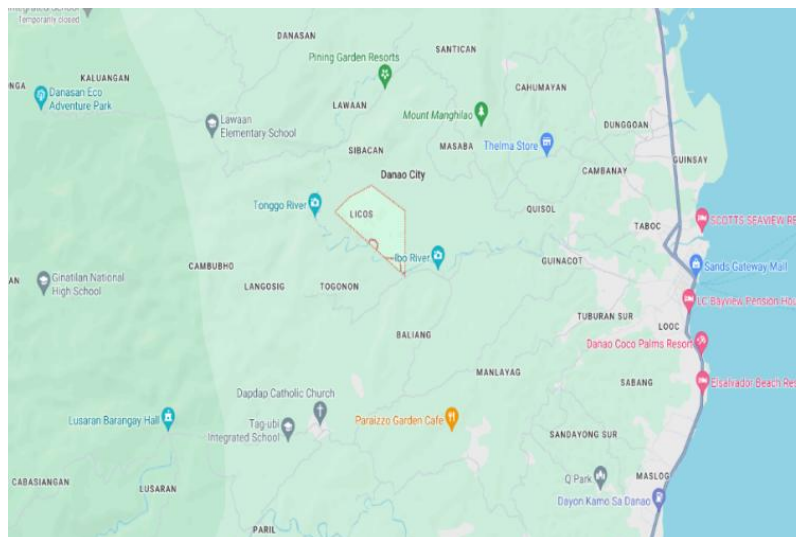


Figure 1. Municipality of Danao, Barangay Licos.

3. RESULTS AND DISCUSSION

Several flora species were found in Quadrat 1, including Labnog, Pineapple, Hagonoy, Cogon, and Makahiya. This broad mix of plant species indicates a diversified ecosystem within the research area. The presence of grasses such as Cogon alongside broad-leaved plants such as Labnog and Pineapple indicates a healthy ecosystem in which several types of flora coexist. The presence of Makahiya, which is known for its delicate leaves, may indicate the sensitivity of certain plant species to environmental conditions in this quadrant.

Table 1
 Quadrat 1 with dimensions of 2x2 meters

Quantity	Flora
1	Labnog (<i>Ficus Septica</i>)
4	Pineapple (<i>Ananas Comosus</i>)
15	Hagonoy/Siam Weed (<i>Chromolaena Odorata</i>)
50	Cogon (<i>Imperata Cylindrica</i>)
4	Makahiya (<i>Mimosa Pudica</i>)

Table 2
 Quadrat 2 with dimensions of 2x2 meters

Quantity	Flora
1	Labnog (<i>Ficus Septica</i>)
1	Coconut Tree (<i>Cocos Nucifera</i>)
13	Hagonoy/Siam Weed (<i>Chromolaena Odorata</i>)
7	Maidenhair Fern (<i>Adiantum Aethiopicum</i>)

Quadrat 2 revealed the presence of Labnog, Coconut Tree, Hagonoy, and Maidenhair Fern. The presence of Maidenhair Fern signifies a damp and shady habitat suitable for fern growth. The presence of coconut trees suggests that taller canopy species exist in this quadrant, which contributes to the plant community's vertical structure and variety. The combination of Labnog and Hagonoy contributes to the floral diversity observed in this area.

Table 3
 Quadrat 3 with dimensions of 2x2 meters

Quantity	Flora
2	Labnog (<i>Ficus Septica</i>)
11	Langa (<i>Piper Aduncum</i>)
50	Hagonoy/Siam Weed (<i>Chromolaena Odorata</i>)
1	Elepante/Indian Heliotrope (<i>Heliotropium Indicum</i>)

The predominant flora species in Quadrat 3 were Labnog, Langa, Hagonoy, and Elepante. Hagonoy's dominance in this quadrant may reflect its ability to adapt to changing environmental circumstances at the study location. The presence of Langa, a species recognized for its aromatic characteristics, contributes to the variety of plant life seen in this area. The presence of many plant species in Quadrat 3 demonstrates the biological diversity and interdependence of the local flora community.

Table 4
 Quadrat 4 with dimensions of 2x2 meters

Quantity	Flora
1	Kaimito/Star Apple (<i>Chrysophyllum Cainito</i>)
1	Lombay (<i>Syzygium Cumini</i>)
1	Sabana/Guyabano (<i>Annona Muricata</i>)
8	Pineapple (<i>Ananas Comosus</i>)
1	Pomelo (<i>Citrus Maxima</i>)
2	Hagonoy/Siam Weed (<i>Chromolaena Odorata</i>)

Quadrat 4 had a diverse range of plant species, including Kaimito, Lombay, Sabana, Pineapple, Pomelo, and Hagonoy. The presence of fruit-bearing trees such as Kaimito and Pomelo indicates a habitat that supports a diverse range of plant species with different ecological functions. The occurrence of Hagonoy, a common weed species, demonstrates the presence of pioneer plants, which are critical to ecosystem succession. The mixed flora of this quadrant highlights the dynamic characteristics of the plant community in the study area.

Table 5
Quadrat 5 with dimensions of 2x2 meters

Quantity	Flora
1	Kaimito/Star Apple (<i>Chrysophyllum Cainito</i>)
1	Pothos (<i>Epipremnum Aureum</i>)
1	Langa (<i>Piper Aduncum</i>)
2	Is-is (<i>Ficus Ulmifolia</i>)
1	Mahogany (<i>Swietenia Macrophylla</i>)
2	Banana Tree (<i>Musa Paradisiaca Linn</i>)
5	Cadena de Amor/Coral Vine (<i>Antigonon Leptopus</i>)

Quadrat 5 displayed a wide range of flora species, including Kaimito, Pothos, Langa, Is-is, Mahogany, Banana Tree, and Cadena de Amor. The presence of fruit-bearing trees such as Kaimito and Banana Tree suggests the availability of food resources in this sector, which supports a variety of wildlife species. The presence of Cadena de Amor, a climbing vine, shows vertical layering of plant life, which adds complexity to the habitat structure. The coexistence of several plant types in Quadrat 5 demonstrates the ecological diversity and richness of the study area.

Table 6
Quadrat 6 with dimensions of 2x2 meters

Quantity	Flora
1	Aratilis (<i>Muntingia Calabura</i>)
1	Bongliw (<i>Polyscias Nodosa</i>)
1	Batilis/Ipil-Ipil/Lead Tree (<i>Leucaena Leucocephala</i>)
2	Pothos (<i>Epipremnum Aureum</i>)
12	Maidenhair Fern (<i>Adiantum Aethiopicum</i>)
1	Santol/Cotton Fruit (<i>Sandoricum Koetjape</i>)

Several flora species were found in Quadrat 6, including Aratilis, Bongliw, Batilis, Pothos, Maidenhair Fern, and Santol. The presence of Aratilis and Santol, both of which are fruit-bearing trees, indicates the possibility of food sources for wildlife in this area. The variety of plant shapes, ranging from trees to ferns, indicates diverse habitats capable of supporting various biological niches. The presence of the delicate fronds of Maidenhair Fern refined the plant community at this location.

Table 7
Quadrat 7 with dimensions of 2x2 meters

Quantity	Flora
4	Pakol (<i>Musa Acuminata</i>)
3	Pothos (<i>Epipremnum Aureum</i>)
8	Snake Plant (<i>Sansevieria Zeylanica</i>)
1	Labnog (<i>Ficus Septica</i>)
7	Wild Kamuning (<i>Murraya Paniculata</i>)
4	Cadena de Amor/Coral Vine (<i>Antigonon Leptopus</i>)

Quadrat 7 featured a diverse range of plant species, including Pakol, Pothos, Snake Plant, Labnog, Wild Kamuning, and Cadena de Amor. The presence of the snake plant, which is noted for its hardiness, indicates that certain species can live in harsh

conditions within this quadrant. The presence of wild Kamuning, a blooming shrub, provides aesthetic value to the plant diversity. The presence of many plant species in Quadrat 7 demonstrates the resilience and adaptation of the local flora community.

Table 8
Quadrat 8 with dimensions of 2x2 meters

Quantity	Flora
1 (cluster)	Bamboo (<i>Bambusa Vulgaris</i>)
1	Labnog (<i>Ficus Septica</i>)
1	Langa (<i>Piper Aduncum</i>)
2	Beauteberry (<i>Callicarpa Americana</i>)

Bamboo, Labnog, and other plant species were discovered in Quadrat 8. The presence of bamboo, a fast-growing plant, implies the possibility of rapid regeneration and growth in this quadrant. The presence of Labnog, a common tree species, indicates that the plant community in this area is stable and mature. The presence of a varied range of flora species in Quadrat 8 enhances the biodiversity and ecological complexity of the research site.

Table 9
Quadrat 9 with dimensions of 2x2 meters

Quantity	Flora
1 (cluster)	Bamboo (<i>Bambusa Vulgaris</i>)
1	Nangka/Jackfruit (<i>Artocarpus Heterophyllus</i>)
1	Pandan (<i>Pandanus Amaryllifolius</i>)
15	Maidenhair Fern (<i>Adiantum Aethiopicum</i>)
3	Labnog (<i>Ficus Septica</i>)

Quadrat 9 features a diverse range of plant species, including bamboo, Nangka, Pandan, Maidenhair Fern, and Labnog. The presence of bamboo, a versatile plant utilized for a variety of purposes, emphasizes the cultural and economic importance of specific species in the studied area. The presence of the Maidenhair Fern indicates a damp and shady climate conducive to fern development in this area. The distribution of diverse plant types in Quadrat 9 provides information on the habitat variety and ecological processes of the Danao area in the Central Cebu Protected Landscape.

Table 10
Quadrat 10 with dimensions of 2x2 meters

Quantity	Flora
1	Bangkal (<i>Nauclea Orientalis</i>)
1	Labnog (<i>Ficus Septica</i>)
1	Patikan (<i>Caryota Mitis</i>)
1	Atipolo (<i>Artocarpus Blancoi</i>)
1	Wild Kamuning (<i>Murraya Paniculata</i>)
1	Bignay (<i>Antidesma Bunius</i>)

In Quadrat 10, a variety of flora species were found, including Bangkal, Labnog, Patikan, Atipolo, Wild Kamuning, and Bignay. Bangkal and wild Kamuning, both of

which are flowering plants, bring color and biodiversity to the plant community in this area. The inclusion of Patikan and Atipolo, both noted for their distinct traits, adds to the overall plant diversity observed. The coexistence of many plant species in Quadrat 10 demonstrates the ecological complexity and richness of the research location.

Table 11
Estimated Population of Flora Species

Area of Licos	480,000			
Flora	Total Quantity for 10 q	%	Quantity for each quadrant	No. of Flora in Licos
Hagonoy (<i>Chromolaena Odorata</i>)	80	30.77%	8	960000
Cogon (<i>Imperata Cylindrica</i>)	50	19.23%	5	600000
Maidenhair Fern (<i>Adiantum Aethiopicum</i>)	34	13.08%	3.4	408000
Langa (<i>Piper Aduncum</i>)	12	4.62%	1.2	144000
Pineapple (<i>Ananas Comosus</i>)	12	4.62%	1.2	144000
Cadena de Amor (<i>Antigonon Leptopus</i>)	9	3.46%	0.9	108000
Labnog (<i>Ficus Septica</i>)	9	3.46%	0.9	108000
Snake Plant (<i>Sansevieria Zeylanica</i>)	8	3.08%	0.8	96000
Wild Kamuning (<i>Murraya Paniculata</i>)	8	3.08%	0.8	96000
Makahiya (<i>Mimosa Pudica</i>)	4	1.54%	0.4	48000
Pakol (<i>Musa Acuminata</i>)	4	1.54%	0.4	48000
Pothos (<i>Epipremnum Aureum</i>)	4	1.54%	0.4	48000
Bamboo (<i>Bambusa Vulgaris</i>)	2	0.77%	0.2	24000
Banana Tree (<i>Musa Paradisiaca Linn</i>)	2	0.77%	0.2	24000
Beauteberry (<i>Callicarpa Americana</i>)	2	0.77%	0.2	24000
Is-is (<i>Ficus Ulmifolia</i>)	2	0.77%	0.2	24000
Kaimito (<i>Chrysophyllum Cainito</i>)	2	0.77%	0.2	24000
Aratilis (<i>Muntingia Calabura</i>)	1	0.38%	0.1	12000
Atipolo (<i>Artocarpus Blancoi</i>)	1	0.38%	0.1	12000
Bangkal (<i>Nauclea Orientalis</i>)	1	0.38%	0.1	12000
Batilis (<i>Leucaena Leucocephala</i>)	1	0.38%	0.1	12000
Bignay (<i>Antidesma Bunius</i>)	1	0.38%	0.1	12000
Bongliw (<i>Polyscias Nodosa</i>)	1	0.38%	0.1	12000
Coconut Tree (<i>Cocos Nucifera</i>)	1	0.38%	0.1	12000
Elepante (<i>Heliotropium Indicum</i>)	1	0.38%	0.1	12000
Lomboy (<i>Syzygium Cumini</i>)	1	0.38%	0.1	12000
Mahogany (<i>Swietenia Macrophylla</i>)	1	0.38%	0.1	12000
Nangka (<i>Artocarpus Heterophyllus</i>)	1	0.38%	0.1	12000
Pandan (<i>Pandanus Amaryllifolius</i>)	1	0.38%	0.1	12000
Patikan (<i>Caryota Mitis</i>)	1	0.38%	0.1	12000
Pomelo (<i>Citrus Maxima</i>)	1	0.38%	0.1	12000
Sabana (<i>Annona Muricata</i>)	1	0.38%	0.1	12000
Santol (<i>Sandoricum Koetjape</i>)	1	0.38%	0.1	12000
Total	260	100%	26	3,120,000

Table 11 shows the estimated population of flora species in the Licos region of the Central Cebu Protected Landscape in Danao. The results show that Hagonoy (*Chromolaena Odorata*) is the most abundant species, with an estimated population of

960,000, underscoring its ecological importance. Langa (*Ficus Septica*) and Cadena de Amor (*Antigonon leptopus*) are also abundant, although species such as Aratilis (*Muntingia calabura*), Bongliw (*Polyscias Nodosa*), and Batilis (*Leucocephala*) have smaller populations. These findings provide important insights for conservation efforts, directing focus to species with different population sizes. Overall, the data help to comprehend the flora diversity of Licos and promote conservation policies aimed at preserving the area's unique biodiversity.

4. CONCLUSION

In conclusion, the quadrat method was used to assess flora species in the Central Cebu Protected Landscape in the Danao Area. The results provided an in-depth understanding of species distribution, richness, and diversity across the sampled quadrats. This study emphasized the need to monitor and maintain the distinctive flora of this ecologically important region to support conservation efforts. Understanding the ecosystem's composition and behavior allows for the development of effective conservation measures to maintain the ecological balance of the protected environment. This study provides important insights into the biodiversity and species interactions in the area, highlighting the importance of protecting the natural heritage of the Central Cebu Protected Landscape for future generations.

5. ACKNOWLEDGEMENT

We extend our heartfelt to the following individuals and agencies for their invaluable contributions to our successful visit to the Central Cebu Protected Landscape in Barangay Licos, Danao City:

First, we extend our sincere gratitude to the CENRO Officials, Ms. Niñalyn Estay and Sir Jeremias Quimbo, for their assistance in facilitating our visit to the Central Cebu Protected Landscape at Barangay Licos, Danao City, Cebu, providing invaluable guidance and support for a smooth and successful trip. To Sir Jeremias Quimbo, Forest Warden, we appreciate your expertise and dedication in giving us a comprehensive tour, sharing your extensive knowledge and passion for the area. Last, we would also like to extend our heartfelt thanks to Hon. Teodosio Depositario, Licos' Barangay Councilor, for accompanying us and contributing to the success of our visit.

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