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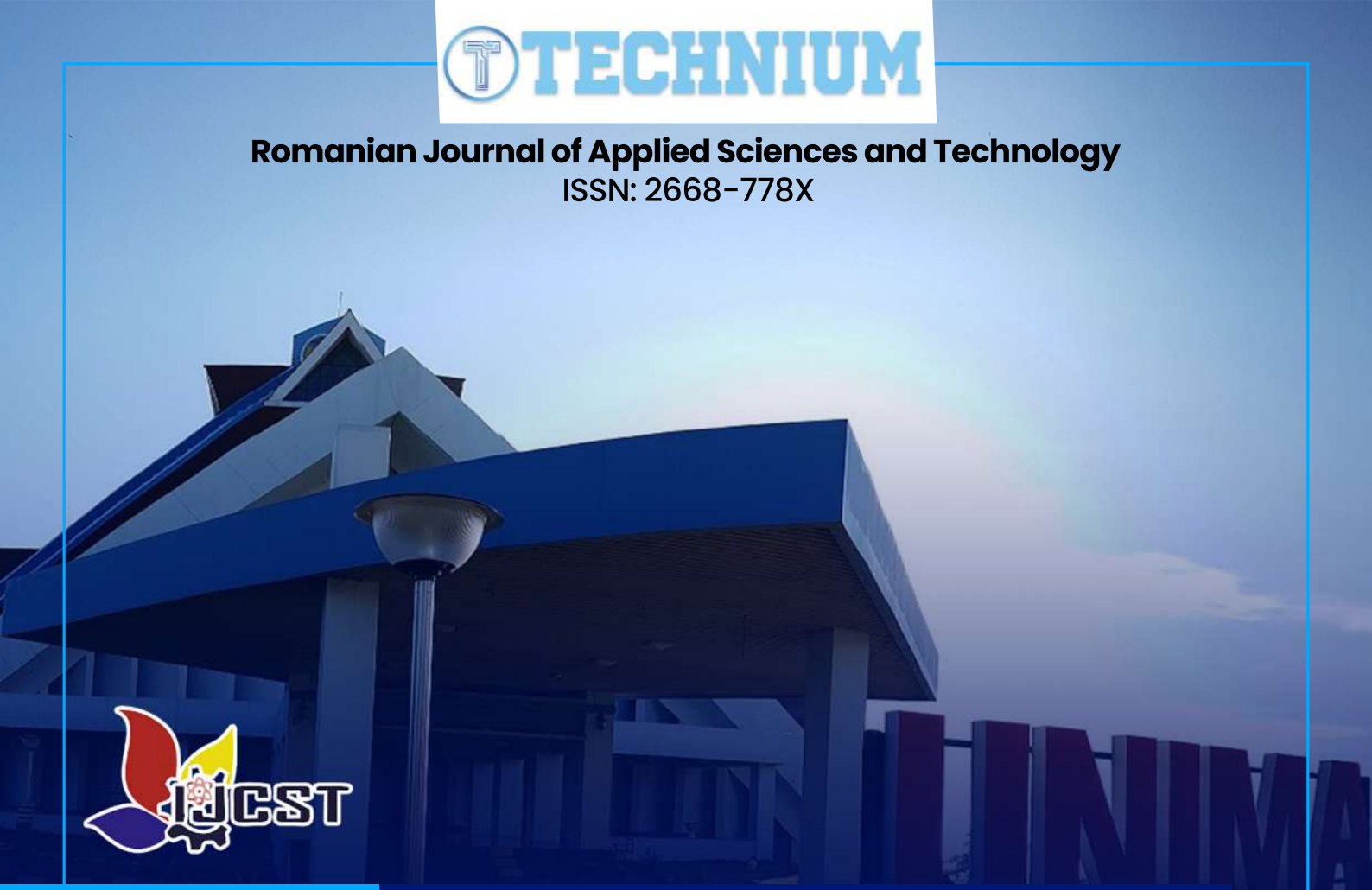

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Vegetation Function Analysis in Musamus University Campus Area

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Abstract. The academic community's point of activity, the campus area, requires green open spaces to support its activities. The Musamus University campus area boasts 27 different types of scattered plants. A qualitative methodology was employed to identify the types and functions of vegetation in the Musamus University campus area, including data collection, vegetation mapping, diversity analysis, function identification, and data analysis. The research revealed that the Musamus campus area lacks vegetation, particularly in terms of shading, aesthetic, and guiding functions, although it does serve well as a noise dampener. Therefore, there is a need to increase the quantity of vegetation, especially those that provide shading, aesthetic, and guiding functions.

Keyword: Green openspave, vegetation, function identification.

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1 Back Ground

The campus area is a designated space for higher education purposes and academic growth. It is home to educational institutions like universities and colleges, which strive to create a favorable environment for learning, research, and intellectual development. One of the notable features of the area is the presence of green landscapes and open spaces. These include parks, gardens, and other outdoor areas that offer a refreshing and calming atmosphere for students and academic staff. It is crucial that we preserve, maintain, and enhance these green open spaces as part of the sustainable development of the campus environment. This will ensure that they remain a valuable heritage for generations to come.

Highlights the significance of green open spaces in the urban environment. These areas not only enhance the aesthetics of the city but also contribute to the comfort of the residents. They provide various benefits like noise reduction, sunshade, and air filtration. Moreover, the arrangement of vegetation, often supported by anti-erosion structures like concrete or natural stone, further adds to the beauty of these spaces. The creation of green open spaces is based on the principles of good design layout, aimed at providing aesthetic appeal and comfort (Shirvani, 1985). The components that form green open spaces include vegetation, open areas, pedestrian paths, and more, all of which contribute to creating a harmonious and inviting urban landscape.

Vegetation plays a significant role in shaping green open spaces, comprising various green plants like trees, shrubs, grass, and ornamental plants. These plants not only enhance the visual appeal but also provide benefits such as creating shade, filtering air pollution, and improving air quality. The Musamus campus area boasts a diverse range of vegetation, encompassing at least 27 types, including rain trees, gamal kencana, ketapang, saga, squirrel tail palm, Pule/milk, Pisonia Grandis, Cemara, paper flowers, yellow frangipani, Thai flowers, yellow palms, bismarkia palms, queen sago, Chinese Ixora flower, Fiji fan palm, coconut, Tanjung, banyan, Japanese spindle, gersen tree, Kasturi, triangular lemur, red shoots, lamtoro, and breadfruit.

Each type of vegetation has a specific role to fulfill based on different needs. The functions of green plants provide numerous benefits, which can be grouped into four main categories as identified by (Widyastuti et al., n.d.) (1) ecological function, (2) aesthetic and architectural functions, (3) economic function, and (4) social function. Additionally, according to (Robinson, 2017), vegetation serves four distinct functions: (1) shading function, (2) guiding function, (3) pollutant-absorbing function, and (4) aesthetic function (Regita et al., 2021).

Studying the functions of vegetation in the Musamus campus area is crucial. Vegetation serves not only as a visual element but also plays a vital role in creating an optimal environment for academic activities. The shade function of vegetation provides coolness and comfort for the campus community. It also facilitates orientation and navigation within the large campus environment. Moreover, vegetation's role in absorbing pollutants is essential in maintaining air quality and reducing the negative impact of motorized vehicle pollution. Apart from functional benefits, vegetation also adds aesthetic value by creating a beautiful and pleasant atmosphere for the entire campus community. By understanding the functions of vegetation, this research can contribute to the design, development, and preservation of the Musamus campus area as a healthy, harmonious, and sustainable area for the future.

2 Research Methods

Methodology, in its essence, serves as a conceptual framework and approach for conducting a study. Research methodology itself is a discipline that examines various research methods and tools (Muhadjir, 1996). The methodology employed in this study is qualitative methodology, which aims to comprehend and interpret the significance of human behavior interactions within specific contexts. Qualitative research endeavors to gain a profound understanding of the subject under investigation, thereby developing a sensitive grasp of the relevant issues (Semiawan, 2010). For this research, a qualitative approach was adopted to investigate the role of vegetation in the Musamus campus region. The study aimed to examine how the vegetation responds to the present environmental conditions and to gain a deeper insight the phenomena in the area, it is important to collect data on the vegetation. This can be done by taking inventory of the plants and measuring parameters like height, diameter, leaf area, and the number of individual plants. Additionally, vegetation mapping is conducted to get a spatial understanding of the distribution and types of plants in the area. The maps are created using the Google Maps cross-tracking method during fieldwork. The data collected can then be analyzed to assess species diversity and vegetation composition in the area. Methods such as analysis of the Shannon-Wiener diversity index, dominance index and species composition can be used to assess the diversity and structure of vegetation communities. After understanding the type and composition of vegetation, the next step is to identify the functions performed by vegetation. This process may involve direct observation, literature review, and consultation with experts in the field of ecology. The gathered data is then analyzed to describe the identified vegetation functions. This entails comparing the data with existing standards or references and interpreting the results to comprehend the role and benefits of vegetation in the broader environment.

3 Disscusion

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3.1 Environmental condition and links

The Musamus campus area is divided into 5 parts, namely:
A. The rectorate area and FKIP,
B. The canteen area and football stadium when unmus,
C. The Faculty of Agriculture area,
D. The dean area and the Faculty of Law, and
E. Part of the Faculty of Engineering, Faculty of Economics, and Faculty of Social Sciences.

The vegetation in the Musamus university area is predominantly composed of rain trees, with zone E encompassing approximately 75% of the total vegetation on campus. The strategic placement of vegetation in the southeastern area of zone E is intended as a pollutant absorbent, targeting both noise and motor vehicle exhaust emissions

Picture 1 Campus distric setting

3.2 Vegetation function

3.2.1 Shading Vegetation

There are several types of shade trees in the Musamus University campus area, including rain trees, banyan trees, red shoots, kasturi trees, gersen trees, ketapang trees, and golden crab trees. These seven types of trees serve as shade vegetation. However, the placement of vegetation along the pedestrian paths is still minimal, covering only about 15 percent of the total length of approximately 1.9 km. This limited shading contributes to a lack of pedestrian activity in the campus area. Additionally, there are only a few vegetation spots in the open areas that provide shade. Ideally, a minimum of 50% of the pedestrian paths' length should be covered with evenly arranged vegetation to create a comfortable and well-shaded zone.

In the campus area, shade vegetation is predominantly comprised of 142 golden ketapang trees. The golden thrumprt trees are chosen for their wide crowns and shady leaves, making them highly effective in providing protection from direct sunlight. Furthermore, the soft texture and appealing green color of the golden ketapang leaves create a comfortable and pleasant atmosphere underneath, making them a popular choice for shading in parks, yards, and other public spaces.

Meanwhile, in public open spaces, the shade vegetation is predominantly comprised of rain trees. Rain trees are chosen for their wide branches and hanging roots, which create a dense canopy, offering ample and comfortable shade for pedestrians and the area below. There are a total of 46 tamarind trees in the campus area used as shade vegetation. However, it is unfortunate that there is only 1 katsuri tree, even though this type of tree is usually preferred as a shade provider due to its dense crown and wide, heart-shaped leaves, effectively providing comfortable shade for pedestrians below.

Picture 2 Shading Vegetation

Picture 3 Palm Tree as Guides Vegetation

3.2.2 Guide Vegatation

Guide vegetation dominate by fox tail Palm tree. Additionally, there are 12 foxtail palm trees used as guide vegetation due to their beautiful shape and large size, which creates an attractive and striking appearance in the landscape. The pinnacle-shaped foliage of the tree provides an interesting visual texture, and its dense crown offers effective shading.

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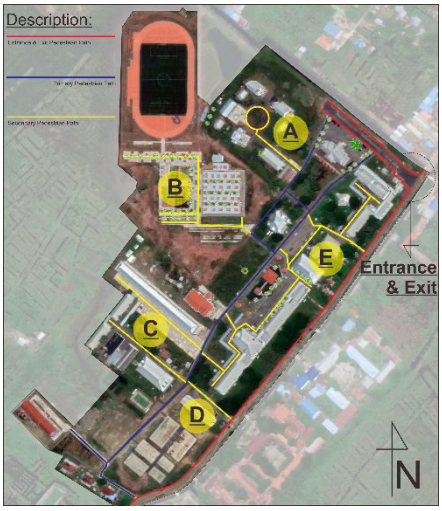
Moreover, the unique shape of the squirrel tail seeds adds an interesting visual element. However, it's essential to consider that squirrel tail trees contain seeds with psychoactive compounds, so their use as guide vegetation must be chosen carefully, considering the purpose and environmental context.



Picture 4 Guides Vegetation

Picture 5 Palm Tree as Guides Vegetation

3.2.3 Polutan Filter Vegetation

Pollutant absorbent trees or filter trees are trees that have the ability to absorb and reduce air pollutants from their environment. Planting these trees on campus can provide significant environmental benefits and create a healthier and cleaner environment for students, staff and visitors to campus. Here are some pollutant absorbent trees in the Musamus campus area.

Rain trees are included in the category of effective pollutant absorbent trees. Like many other large trees, tamarind has the natural ability to filter and absorb pollutants from the air, thereby helping to reduce pollution levels. In the Musamus area there are 136 trees planted in the southeast of the Musamus campus which is adjacent to the old Mopah road which is a vehicle lane.

Picture 6 rain tree as a polutan filter

Saga tree, also known as peacock flower tree (Delonix regia), is a beautiful and attractive tree with distinctive fiery red flowers. Although not as popular as the rain tree in the context of pollutant absorption, the saga tree also provides several benefits in reducing air pollution. There are 16 saga trees in the southeast area which is directly adjacent to the campus area.

Picture 7 Saga Tree as Guides Vegetation

3.2.4 Aesthetic Vegetation

Aesthetic vegetation refers to plants or plants planted with the aim of enhancing the beauty and aesthetics of the Musamus campus area. Plants with high aesthetic value are often used to create parks, gardens, city parks, greenways, and campus environments to provide an interesting and pleasing visual touch.
Some of the aesthetic vegetation in the Musamus area:

1. Red Shoots This plant has attractive red, pink, or purplish-red leaves. Varieties such as Alternanthera dentata "Purple Knight" or Alternanthera ficoidea "Red Threads" are often grown as ornamentals or as edging plants in gardens.
2. Bugenvil are used as aesthetic vegetation because they have brightly colored and long-lasting flowers, providing a wide choice for decoration and decoration with a touch of bright and attractive colors, as well as beauty that retains its appeal even after being harvested or dried. In addition, paper flowers are easy to grow and resistant to different

environmental conditions, making them a popular choice for use in gardens, flower arrangements, or indoor decoration, providing a pleasing aesthetic touch and beautifying the environment.

3. The triangular palm (Dypsis decaryi), also known as the Madagascar triangular palm or the octagonal triangular palm, is often used as an aesthetic vegetation because of its unique attractive characteristics and giving a garden or landscape an exotic touch.
4. Chinese Ixora is used as an aesthetic vegetation because it has beautiful flowers, various colors, and grows fast and lasts a long time, adding to the visual beauty of the open space.
5. The fan palm is used as an aesthetic vegetation because it has wide, neat leaves, creates an attractive tropical atmosphere and gives an exotic touch to the garden or open space.
6. Yellow palms are used as an aesthetic vegetation because they have attractive stems with a distinctive golden yellow color and soft green leaves that give a beautiful tropical impression in the garden or opens pace.
7. Thai flowers are used as aesthetic vegetation because of the beauty of their exotic shapes and colors, which are able to beautify and give a unique feel to garden landscapes, garden plots, or public spaces.

Picture 7 Palm Tree as Guides Vegetation

Picture 8 flower as AestheticVegetation

4 Conclusion

The conclusion from the research on the identification of vegetation functions in the Musamus area, it was found that shade vegetation, guiding vegetation, and aesthetic vegetation in the Musamus campus area were still minimal or lacking in the area. To enhance the environment for activities, it's important to plant more tall and shady trees. Directional plants like border plants and road markings should also be increased to aid navigation and usage of space. Increasing the aesthetics of vegetation will not only provide functional benefits but also add visual value to the area, creating a more beautiful and pleasant atmosphere for residents and visitors. By prioritizing the three types of vegetation, we aim to create a more balanced and attractive environment that respects nature and aesthetics. The application of vegetation, especially through the presence of rain trees, has helped reduce pollution levels in the area. However, to ensure the effectiveness and optimal performance of pollutant absorbing vegetation, more in-depth further research is needed. Further research could include a more detailed analysis of the impact of vegetation on air quality, the composition of pollutant types that can be tackled, and determining the most efficient amount and location of growing vegetation. With more comprehensive research, it is hoped that the Musamus area will be able to implement a more appropriate strategy in using pollutant-absorbing vegetation, so that the campus environment can remain clean and healthy for all its residents and have a positive impact on the surrounding area.

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