

Plants in A Square: Explore Plants Description with QR Code Feature

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Abstract. The Indonesia especially South Sulawesi contained the diversity of plant species. The number of species that exist it is necessary to identify each type. To facilitate the identification process, conducted the study of exploration of plant's description by QR Code feature. QR Code or quick response code, which is a type of two-dimensional bar code contains information that facilitates generating and reading (encoding and decoding) of information on a smartphone. The purpose of this study to facilitate describing of the plant with the QR Code features. This study located in Tope Jawa Coast, Takalar, South Sulawesi, with a descriptive study using survey and identification methods. The results of the study revealed 25 species of plants that have been identified and loaded into a QR Code that can be scanned by smartphone.

Key words: Exploration, descriptions of plants, QR Code

INTRODUCTION

Indonesia became the world's leading in terms of global biodiversity. One of the species diversity in Indonesia is regarded as a center of plant diversity, economic plant of the world. Some plants from Indonesia, such as bananas and coconuts have spread throughout the world. The types of timber being traded, also tropical fruits (durian, duku, bark, rambutan, bananas and so on), orchids, bamboo, rattan and others mostly from Indonesia. Therefore, Indonesia is known as one of the countries with greatest biodiversity in the world (megadiversity) and is the center of the world's biodiversity (megacenter of biodiversity) (Mac Kinnon, 1992). Indonesia, particularly in South Sulawesi, there are a variety of plants with colors, shapes, and sizes vary. Many species are grouped based on the differences and similarities of characteristics in plants. So that conducted the classification process (grouping). Classification is the process of grouping plants by the similarities and differences in the characteristics possessed. Characteristics is the basis classification is different depending on the objectives to be achieved. Characteristics that can be used as the basic criteria for the classification of plants is the morphological features. Through the morphological features of a species can be distinguished one with the other species more easily and objectively (Cronquist, 1981). To further reinforce the limitations taxon of a species, then do the identification.

Identification, is a basic activity, to determine whether a species identified is identical to the species that have been classified and have been named before. Rideng (1989) explained that the identification is to determine the similarities and differences of the two elements (plants), whether these two elements is similar or not.

In general, the identification is done using identification keys. Identification key prepared using morphological characteristics contrary, separating the names of plants in the key into smaller groups.

Based on the explanation above, so that the process of identifying the plant species more effectively, required practical storage devices contain the same information is available in the identification key that will relieve reading and writing (encoding and decoding) a description of the plant information. One effective tool is so-called QR Code (quick response code). QR Code which is a type of matrix codes or two-dimensional bar code, introduced by the Japanese company Denso Wave in 1994. QR Code is one of social networking on a smartphone which is a compact

storage tool that contains some information and ease the reading and writing (encoding and decoding) of information (Denso Wave Inc, 2003).

Characteristics of the QR Code that can accommodate large amounts of data. Theoretically many as 7089 characters maximum numerical data can be stored on it, the high density (100 times higher than linear symbols code) and code readability quickly. QR Code accomplishes this task through position detection patterns located at the three corners of the symbol. These position detection patterns guarantee stable high-speed reading, circumventing the negative effects of background (Denso Wave, 2008).

Based on the explanation above, it is necessary to doing the explore of the plant description by using the QR Code in facilitating the process. The three main types of content associated with the use of QR Code can be viewed on mobile devices. The first type provides additional text information. This is one content QR Code that can contain text format, for example, the description of the species that have been identified. The second type is a link (URL), where we can scan the address / website as a QR Code barcodes. The third type provides additional Geo location information, for example, scan a plant sites have been identified in the QR Code and can be directly connected to Google Maps, can also be given in the format of GPS coordinates (Lee, 2011).

CONTENT AND METHOD

Here This study is descriptive study that aims to ease description of the plant by using the QR Code. This study located around of Tope Jawa beach, Takalar, South Sulawesi. This study was using survey and identification method, survey conducted by determine the location of sampling first, then made 3 transects where each transect point is determined based on the diversity of species at that point. Each transect consists of 5 plots each plot measuring 20x20m, and the distance of each plot 10m.

Identification phase of plants species carried out on each species of higher plants species found on plots in transects that determined by using systematic random sampling technique, the technique of sampling by choosing species that already represent similar species in a transect.

Carefully observe a specimen to be identified is a good habit that needs to be developed. Beginners should choose plants that are still fresh, complete with roots, stems, leaves, fruits and seeds. Specimens with all parts of the above will help in the identification. For practical purposes, try to select plants that flower relatively large, so that the parts are easily observed. In order for the observation to the parts of plants can be done well, required tools such as a hand lens, needles, razor blades, etc. (Rideng, 1989).

According to Rideng (1989) again, there are several steps in the observations of plants that will identified, as follows:

1. Determine whether classified as herbaceous or woody plants, when classified as herbs are classified as seasonal or perennial
2. Viewing the names of the parts of the flower
3. Calculate the number of Calix and sepals
4. Observe whether the leaf sheath and the corolla are separate or unite
5. Calculate the number of stamens, observe where they are attached. Note whether stalk pollen and anthers separate or unite
6. Count the number of pistils, stalk pistil and stigma
7. Remove the flowers and stamens. Use a razor blade to make a cross-sectional view of the future. Calculate the amount of room in it, observe seed
8. Checking the type, position and leaves pertulangan
9. Viewing distribution

The few species that do not have the completeness of the description as the number of stamens, pistils and others because the species found are not currently in the flowering conditions and so on.

The final step encoded of each species (transferred data into QR Code) using QR Code Generator application on a PC computer. QR Code that has been done ready for translated directly by smartphone using QR Code reader. This software is a reader/ scanner which must be installed first on a smartphone that equipped with camera.

RESULTS AND DISCUSSION

25 species of plants are the member of 19 familys and 16 orders. 2 of 16 orders which are Fabales and Gentianales is an order which dominated the area around Tope Jawa Beach. Both of this order consists of various

famili, such as on the Fabales are familia Caesalpinaceae with species *Caesalpinia bonduc* (Gorek) and *Cassia alata* (ketepeng), familia Fabaceae with species *Crotalaria ternatea* (telang flower) and *Crotalaria micans* (orok-orok), and in family Mimosaceae with species *Mimosa pudica* (shame plant). Whereas in order gentianales are familia *Mandevilla* Apocynaceae species sanderi (purple trumpet flower), *Catharanthus roseus* (Tapak dara), and *Tabernaemontana divaricata* (Mondokaki) and familia Asclepiadaceae species *Calotropis gigantea* (Biduri).

In the around of Tope Jawa Beach, there are also plants with the habitus of strongly high trees like the familia of Anacardiaceae with species *Lannea coromandelica* (Wood Java) and *Mangifera indica* (Mango) and also some typical marine plants, familia of Pandanaceae with species *Pandanus odoratissimus* (Pandan sea) and familia Areaceae with species *Cocos nucifera* (Coconut).

Data from these species can be ensured that the area of around the Tope Jawa Beach is dominated by bushes plants and strongly high trees. For more details can be seen in **Table 1**, 25 species of plants along familys and following orders.

TABLE 1. Species in Tope Jawa Beach, Takalar, South Sulawesi

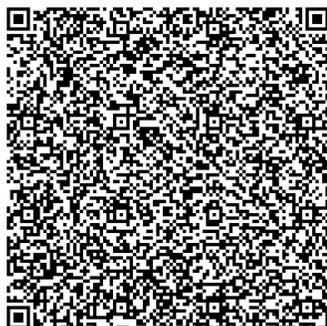
No	Species	Local Name	Family	Ordo	Habitus
1.	<i>Amorphophallus campamulatus</i>	Suweg	Araceae	Arales	Clump
2.	<i>Annona squamosal</i>	Srikaya	Annonaceae	Magnoliales	Clump
3.	<i>Crynum asiaticum</i>	Bunga bakung putih	Ammarillidaceae	Liliales	Herbs
4.	<i>Gmelina arborea</i>	Jati putih	Verbenaceae	Lamiales	Tree
5.	<i>Lantana camara</i>	Kembang telekan			Bushes
6.	<i>Ipomoea pes-caprae</i>	Tapak kuda	Convolvulacea	Solanales	Bushes
7.	<i>Caesalpinia bonduc</i>	Gorek	Caesalpinaceae		Bushes
8.	<i>Cassia alata</i>	Ketepeng			Bushes
9.	<i>Clitoria ternatea</i>	Kembang telang	Fabaceae	Fabales	Bushes
10.	<i>Crotalaria micans</i>	Orok-orok			Bushes
11.	<i>Mimosa pudica</i>	Putri malu	Mimosaceae		Bushes
12.	<i>Mangifera indica</i>	Mangga	Anacardiaceae	Sapindales	Tree
13.	<i>Lannea coromandelica</i>	Kayu jawa			Tree
14.	<i>Mandevilla sanderi</i>	Bunga terompet ungu			Bushes
15.	<i>Tabernaemontana divaricata</i>	Mondokaki	Apocynaceae	Gentianales	Bushes
16.	<i>Catharanthus roseus</i>	Tapak dara			Clump
17.	<i>Calotropis gigantea</i>	Biduri	Asclepiadaceae		Herbs
18.	<i>Cocos nucifera</i>	Kelapa	Areaceae	Arecales	Tree
19.	<i>Syzygium cumini</i>	Coppeng	Myrtaceae	Myrtales	Tree
20.	<i>Musa paradisiaca</i>	Pisang	Musaceae	Zingiberales	Tree
21.	<i>Momordica balsamina</i>	Paria kecil	Cucurbitaceae	Violales	Bushes
22.	<i>Ricinus communis</i>	Jarak minyak	Euphorbiacea	Euphorbiales	Clump
23.	<i>Pandanus odoratissimus</i>	Pandan laut	Pandanaceae	Pandanales	Tree
24.	<i>Chromolaena odorata</i>	Tekelan	Asteraceae	Asterales	Bushes

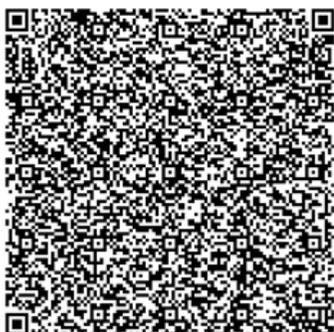
25. *Hibiscus tiliaceus* Waru Malvaceae Malvales Tree

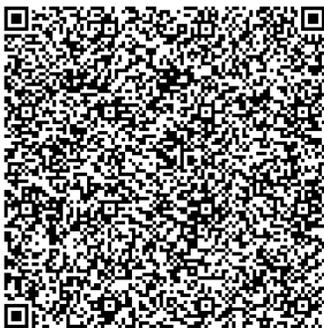
The plants that have been identified then encoded (transferred) into 25 QR Code. Here's the QR Code has been transferred and grouping based on family.

TABEL 2. QR Code of identified plants

No.	QR Code
1. Familia Araceae	 <p data-bbox="259 793 609 821"><i>Amorphophallus campamulatus</i></p>
2. Familia Annonaceae	 <p data-bbox="316 1234 519 1262"><i>Annona squamosa</i></p>
3. Familia Ammarillidaceae	 <p data-bbox="365 1659 560 1686"><i>Crynum asiaticum</i></p>

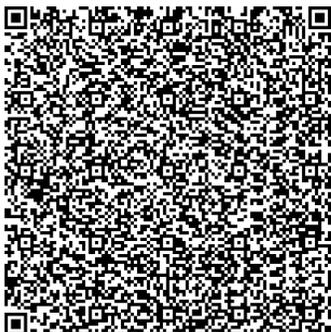
4. Familia Verbenaceae*Gmelina arborea**Lantana camara***5. Familia Convolvulaceae***Ipomoea pes-caprae***6. Familia Caesalpinaceae***Caesalpinia bonduc**Cassia alata***7. Familia Fabaceae**

*Clitoria ternatea**Crotalaria micans***8. Familia Mimosaceae***Mimosa pudica***9. Familia Anacardiaceae***Mangifera indica**Lannea coromandelica***10. Familia Apocynaceae***Tabernaemontana divaricata**Mandevilla sanderi**Catharanthus roseus***11. Familia Asclepiadaceae**



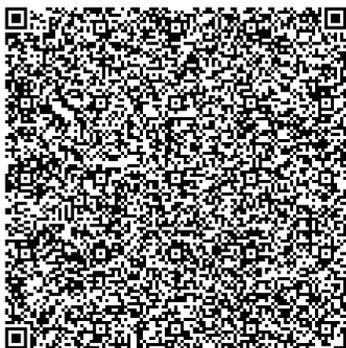
Calotropis gigantea

12. **Familia Areaceae**



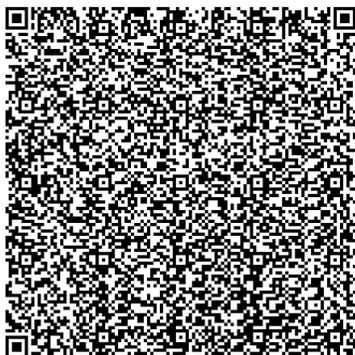
Cocos nucifera

13. **Familia Myrtaceae**



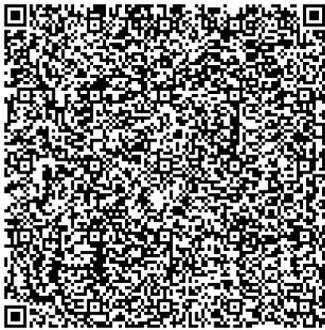
Syzygium cumini

14. **Familia Musaceae**



Musa paradisiaca

15. **Familia Cucurbitaceae**



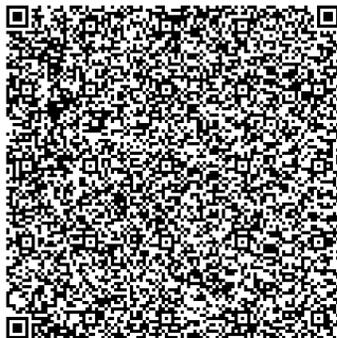
Momordica balsamina

16. **Familia Euphorbiaceae**



Ricinus communis

17. **Familia Pandanaceae**



Pandanus odoratissimus

18. **Familia Asteraceae**



Chromolaena odorata

19. **Familia Malvaceae**



Hibiscus tiliaceus

Exploration results also revealed that the species contained in transects 1, 2 and 3 are less diverse kinds, such species in transect 1 also be found in transect 2 and 3. As for on each transects consisting 5 plots, which not continued to the plot further due to there are no additional species/ increasing of the number of species are meaningless (adding less than 10%).

CONCLUSION

Based on the results of the study above can be concluded that the study of explore plants description with QR Code feature revealed 25 identified plants. The species have been found around Tope Jawa Beach, Takalar, South Sulawesi were identified by observing the morphology characteristic such as habitus, stem, leaves, flowers, fruits and seeds. This area dominated by bushes plants and strongly high trees. QR Code that have been so then can be directly translated to use QR Code reader software on a mobile device equipped with a camera.

SUGGESTION

Based on the conclusion, proposed some suggestions for further study who will use a feature QR Code, as follows. First, further research, could determine the location with a more diverse kinds of species that can extend the range of data retrieval. Secondly in order to make the identification process is not only limited growth in higher plants but can also be done at a lower plants.

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