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THE DYNAMICS OF PANDANUS ILLUSTRATIONS FROM A HISTORICAL PERSPECTIVE

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ABSTRACT
SIHOTANG, VERA B. L. 2013. The dynamics of *Pandanus* illustrations from a historical perspective. Reinwardtia 13 (5): 449–455. — *Pandanaceae* is placed in the superorder *Pandaniflorae* and the order *Pandanales*, indicating its uniqueness when compared with the other seed plants. *Pandanaceae* contains three genera, *Pandanus, Sararanga* and *Freycinetia*. Limited collections seem to be one reason why botanical illustrations are made, so that people can enjoy their "collections" from a picture painted on canvas. Botanical illustration is one type of record that can also give evidence about whether the plant exists. In addition, botanical illustration can give information about the growth of the plant, and historical evidence can be traced. There is no doubt that *Pandanus* has also been well illustrated. Later, further developments in *Pandanus* research obviously influenced the illustrations of *Pandanus*.

Key words: *Pandanaceae, Pandanus*, history, illustration.

ABSTRAK
SIHOTANG, VERA B. L. 2013. Dinamika ilustrasi *Pandanus* dari perspektif sejarah. Reinwardtia 13 (5): 449–455. — *Pandanaceae* menjadi unik jika dibandingkan dengan tanaman berbiji lainnya karena merupakan satu-satunya representasi dari superordo *Pandaniflorae* dengan ordonya *Pandanales*. *Pandanaceae* terdiri dari tiga genus, *Pandanus, Sararanga*, dan *Freycinetia*. Keterbatasan koleksi nampaknya menjadi salah satu hal yang mendorong dibuatnya ilustrasi dari sebuah tanaman, sehingga manusia pun dapat menikmati "koleksi" tanamannya lewat sebuah gambar di atas kanvas. Ilustrasi tumbuhan lewat sebuah lukisan menjadi salah satu rekaman yang menjadi bukti bahwa tumbuhan itu pernah ada dan menjadi gambaran mengenai perkembangan tumbuhan itu sendiri. Artinya, lewat ilustrasi tumbuhan, sebuah bukti sejarah pun dapat dilacak. Tidak dapat diragukan lagi bahwa *Pandanus* juga telah terilustrasi dengan baik, Perkembangan selanjutnya, penelitian yang lebih mendalam mengenai *Pandanus* ternyata mempengaruhi ilustrasi-ilustrasi *Pandanus* itu sendiri.

Kata kunci: *Pandanaceae*, *Pandanus*, sejarah, ilustrasi.

INTRODUCTION

Describing species is one important activity in term of biology research. In the botanical field, there are certain requirements which must be fulfilled, for example a researcher must choose a plant specimen that will be a voucher specimen as well as take photographs and make illustrations that will provide documentation about the species being studied. As well as documentation, a researcher also makes an illustration to clarify the smallest parts of the plant that are not easily visible. Illustrations also allow researchers to differentiate one species from another.

In the past, when documentation media was not as sophisticated as today, a researcher had to make an illustration of the plant rather than taking photographs. This illustration could be made by the researcher or by a specialized illustrator who joins the research. In the history of biological research, botanical illustrations are the illustrations that received most of the attention. There have been changes in plant illustration over time. At the beginning of 16th century, illustrations were used to present the beauty of the plant, whereas in the next centuries, the depiction of the plant was more detailed and specific (Rix, 1989). This shows that there has been a progressive development in botanical illustration from century to century, and we can see that the characteristics of botanical illustration have changed between the 1600s and 1900s.

Botanical illustration has been influenced with the progress of human technology. For example, using magnification with a sophisticated microscope and camera, we can now see the details of plant parts like pollen grains, cellular structure of tissues, and even the organelles inside cells. Without the improvement of technology, we would not

be able to see these small structures, which is essential for biological research. As well as being important for science, botanical illustrations was also initially used by society for other reasons, such as religious purposes and worship, and for beauty or as art, for example cave paintings, statues, and other historical objects. Thereby, illustration is not only a part of biological research but is also a record of the journey of the researcher and the social situation which influenced him/her. Therefore, the history of illustration also tells us about social change and trends in knowledge.

Pandanaceae is a representative from the order *Pandanales* and is the sole representative of the *Pandaniflorae* super order. *Pandanaceae* has three genera, *Sararanga* with 2 species, *Freycinetia*, with about 180 species, and *Pandanus* itself with 500-700 species (Jebb, 1991). Compared to the other two other genera, *Pandanus* has the widest distribution, from Tahiti to West Africa, and from Australia to the foothills of the Himalayas, and Hawaii. *Pandanus* is also frequently illustrated over a long time period, making it suitable for a study on the development of illustrations.

As described above, this paper aims to explore the different characteristics in *Pandanus* illustrations in relation to the changing of the centuries. The scope of this study is from the 1600s to the late 1900s. The late 1600s was the beginning of *Pandanus* illustrations in Indonesia, starting with the Dutch scientist Rumphius who settled in Ambon in 1653. Through his research, he produced paintings of *Pandanus* that were contained in a book called the *Herbarium Amboinense*. This study used the 1900s as the end point because at this time illustrations of various types of *Pandanus* were found along with the rapid growth of research on this plant.

The purpose of this research is to explain the characteristic differences in *Pandanus* illustrations from the 1600s to the 1900s. In addition, the author will also explore the history of plant illustrations, with *Pandanus* illustrations as a case study.

METHODS

A qualitative method was used in this study. That method was divided into five stages, namely topic selection, gathering information sources, source evaluation, interpretation, and manuscript preparation. The selected topic was *Pandanus* plant illustrations, and several *Pandanus* illustrations from books and reprints were examined. The illustrations, which were from different years, were compared and differences in characteristics were recorded.

In addition to examining *Pandanus* illustrations, information sources explaining the history of illustration were consulted in order to see if the history of *Pandanus* illustration would follow a similar pattern. Evaluation of these sources was carried out to determine the originality of the data. These histories were analyzed using a descriptive analysis and analytic model with a historical approach (Gottschalk, 1950) to determine for how plant illustrations have developed over time. In the search for the sources, difficulty was found due to a lack of *Pandanus* illustration from 18th century. Also, we compare the characteristics of *Pandanus* illustration over time with the general model for development of illustration style and determine if *Pandanus* fits the model.

RESULTS AND DISCUSSION

Illustration is a means by which texts are enhanced and made capable of conveying information and emotion in a way that words cannot. In this study, we will examine *Pandanus* illustration from 17th century to the 20th century. *Pandanus* illustrations were produced in 17th century by the Dutch naturalist who worked for the Dutch East India Company *i.e.* George Eberhard Rumpf (1628-1702). He is also known as Rumphius, and he spent most of his time in Indonesia on the island of Ambon where he lived from his arrival in 1653 until his decease.

The Herbarium Amboinense consist of twelve books, published in six volumes. Although the book was published in the 1700s, Rumphius made illustrations in the 1600s so we can say that these illustrations represent illustration characteristics of 17th century. Some of the characteristics of *Pandanus* can be seen. For example, the first illustration he describes is *Pandanus verus* (Fig. 1A). In this picture he shows the small pandanus fruit. He describes the main stem with segmented roots and prop roots, and describes the leaves as long and narrow with a thorn on the side of the leaf. The second illustration is *Pandanus fpurius* (Fig. 1B). Apparently this was a mature pandanus because the stems are usually branched only in adult plants. The leaves were located at the end of the branch. The fruit in this picture is larger, and the flowers are also shown. The third illustration is *Pandanus humilis* (Fig. 1C). In this illustration, Rumphius showed characteristics from *Pandanus* which is an inverted cone and short stem as well as the alternate leaf arrangement and flowers that grow from axillary leaves.

Rumphius tried to illlustrate *Pandanus* with detailed description. He illustrated inflorescence in Fig. 1B, though it was not too detailed. Also, he

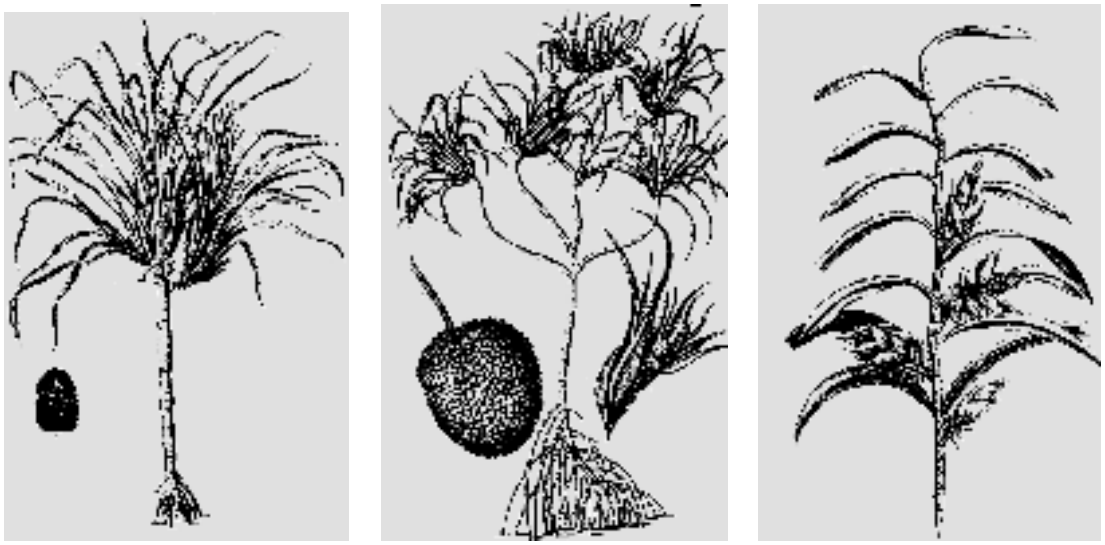

Fig. 1. Pandanus illustrations produced by Rumphius from *Herbarium Amboinense* in 17th century. *A. Pandanus verus*; B. *P. fpurius* ; C. P. *humilis*. (Source: *Herbarium Amboinense).*

illustrated an aggregate fruit heads comprised of many tightly bunched wedges (Fig. 1B), the ring pattern on bark characteristics (Fig. 1A) and prop roots (Fig. 1C), to the 17th century, scientifically this illustration can represent *Pandanus*. Rumphius already started the distribution of parts of the plant and this was followed by illustrators in the next century. In terms of beauty, these illustrations are not enough to represent it.

Another *Pandanus* illustration which was studied is a *P. tectorius* illustration made by Sydney Parkinson in the 18th century, namely in the year 1769 in Tahiti. He was a painter in the field of botany and made this illustration when he participated in the voyage with Captain Cook to Tahiti, New Zealand, and Australia. This illustration uses water colors on paper. In the illustration, Parkinson drew the male inflorescence of *Pandanus tectorius* (Fig. 2A - Natural History Museum, London). In this century, illustration has begun with detailed character. In terms of beauty, this illustration can represent it even though the color of the real male inflorescence of Pandan did not correctly enough. Nevertheless, scientifically this illustration cannot represent it, because part of the male inflorescence is not described in detail.

Fig. 2B are botanical illustrations of *Pandanus leram* (Martelli, 1913) in late 18th century (1792). This illustration began to focused on one part of plant, though it is not too detail as well as illustration in 19th century. The illustration focused on drupe, but cannot accurately describe the drupe. When viewed at a glance, we will not know that these illustrations depict *Pandanus* drupe. Both scientifically as well as beauty, this illustration cannot represent them, while the first impression of this illustration is a pencil scratches only. Illustrations from the 19th century are characterized by the interest of the illustrator on one particular part of the plant such as flowers or leaves. *Pandanus* illustration from this century represented by original illustration from Curtis's Botanical Magazine, published as a watercolor and pencil on paper plate on 1st November 1857. The specimen figured here was sent to Kew by the Governor Hercules G.R. Robinson from Saint Kitts, this species is a native of the West coast of Africa (Fig. 3A).

The illustration focused on fruit heads comprised an aggregate of many tightly bunched wedge. The *Pandanus* illustration was produced with good coloring in order to illustrate the fruit and leave more accurately. People will know that this is *Pandanus* leaves by looking this, because the leaves represent lifelike. It also shows shaped phalange or drupe and describe part of it. Also, this illustration give great attention to detail and precision, not only a correct image but a beautiful one as well. Illustration in Fig. 3B shows *Pandanus* branch cutting with female inflorescence. The original illustration is a watercolor and pencil on paper plate published on 1st September 1857 and was stated to have come from Madagascar. Unfortunately, we can not see morphological characteristics of *Pandanus* by looking this illustration.

Pandanus illustration in Figs. 4A and 4B focused on drupe of *Pandanus*. Scientifically, those illustrations can describe drupes accurately, either outside or inside appearance. Figs. 4A and 4B

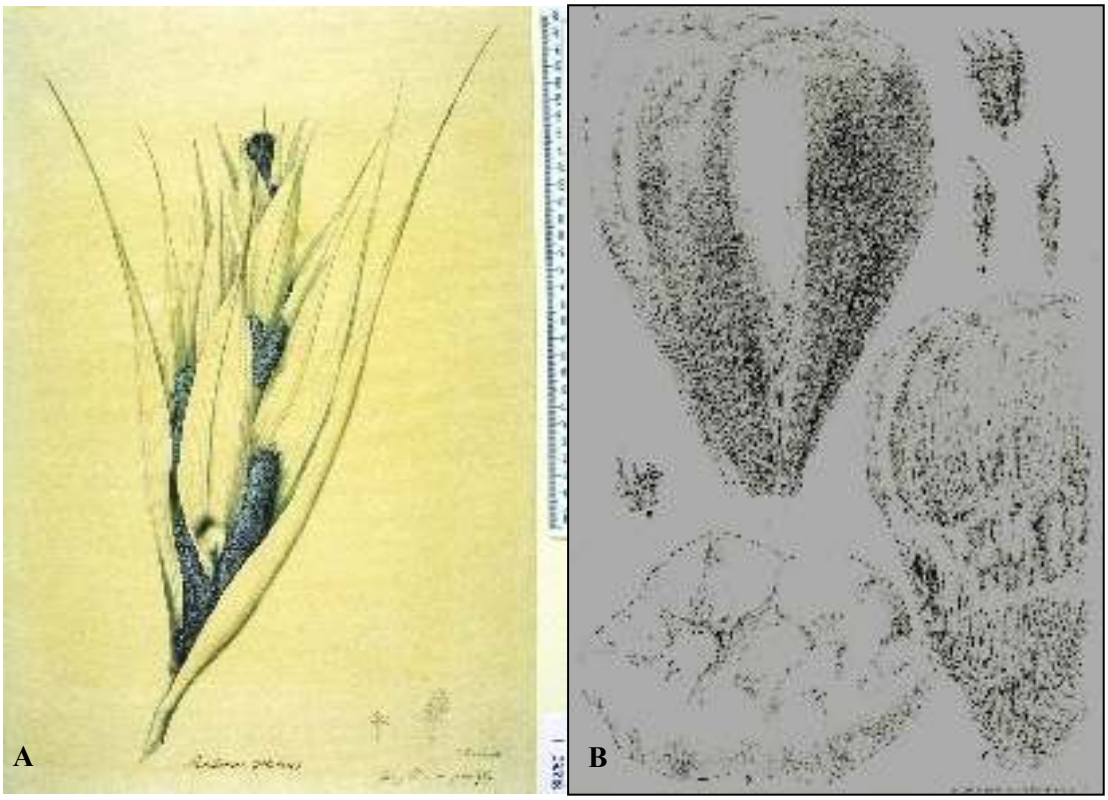

Fig. 2. A. *Pandanus tectorius* illustration by Sydney Parkinson. Source: http://internt.nhm.ac.uk; B. *Pandanus leram* illustration in 18th century. Source: *Enumerazione Delle "Pandanaceae"* .

show the drupe characteristics from *Pandanus dubius* and *Pandanus kaida*. Fig. 4B-A shows drupe with longitudinal section from *Pandanus drupaceus*. Fig. 4B-B shows drupe with lateral section from *Pandanus eydeouxia*. By looking those illustrations, we can imagine what the drupe looks like, when it took apart from the fruit. Most people who see those illustrations perhaps do not know whether it is *Pandanus*. Text was heavily used to describe the botanical illustrations, it is used as supplement for the illustration.

By the 20th century, *Pandanus* illustrations were much more specific than those from the 17th, 18th, and 19th centuries. *Pandanus* illustration in these centuries did not just describe the plant as a whole or only the outside appearance but also the small part which is inside the plant. Illustration of this plant was already developed from the time that Linnaeus started classifying plants. In the 20th century the illustrations were more detailed and focused. Illustration was really intended to examine certain parts of the plant more deeply, and in this case only one part of the plant was drawn.

In some *Pandanus* reprints of the 1900's, most of the illustrations focused on one part only, but in more detail. There are some parts of the plants that were not shown in the *Pandanus* illustration in 17th century and early 18th century, but that appeared in the 20th century illustrations, including the phalange, drupe, base of leaves, leaf tip, the anther, filament, and the stigma (Fig. 4C). Phallange is illustrated in full form and split lengthwise. Great attention in measurement was taken but the illustration in split form doesn't looks like the real one.

Another illustration that distinguishes *Pandanus* illustration in 17th, 18th, and 19th century with *Pandanus* illustrations from 20th century can be seen in the *Field Guide to Pandanus in New Guinea, the Bismarck Archipelago and the Solomon Islands* (Jebb, 1991). In 20th century, plants illustrations were produced in the form of field guides. These books served to help the amateur botanist when identifying a specimen. Until the mid-20th century, the coloring in plant illustrations was still done by hand. In the book, Matthew Jebb represents trees, fruit, leaves, and male inflorescence of each *Pandanus*. In addition, the size of the leaves, and drupe, the height of the prop roots, and the height of the tree are given (Fig. 5). Scientifically, this illustration cannot represent the real *Pandanus*. Morphological characteristics, the drupe, the leaves cannot be seen by looking this illustration.

In the 20th century, illustrations of *Pandanus furcatus* were also produced in the form of lithographs by J.N Fitch. This illustration is found in the *Curtis Botanical Magazine*, in 1914 and 1916. It is said that the coloring of the illustration

Fig. 3. A. *Pandanus candelabrum*, P. Beauv. Source: http://plants.jstor.org/visual/kcur000001263; B. *Pandanus pygmaeus* Thouars. Source: http://plants.jstor.org/visual/kcur00000814.

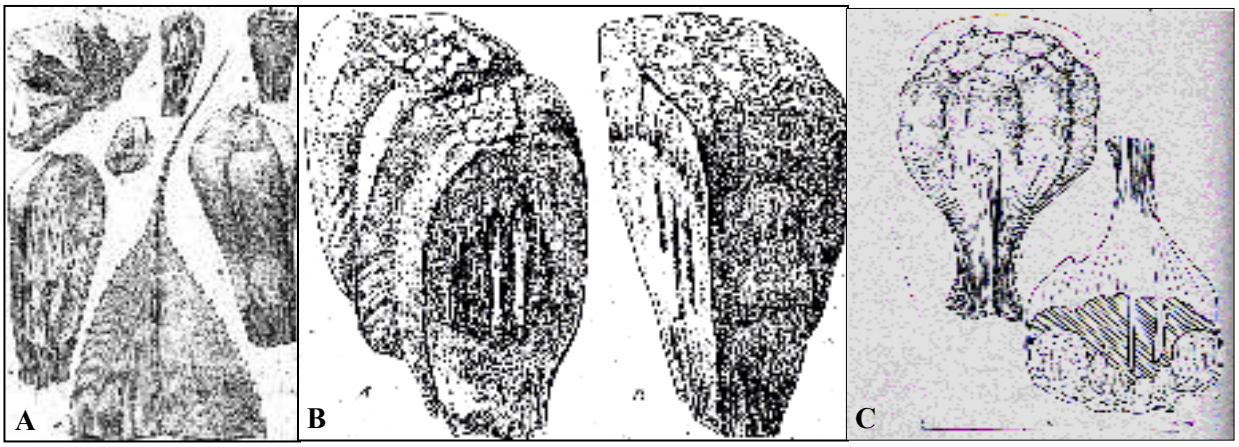

Fig 4. A. Illustrations A–D *Pandanus dubius* Spreng., illustrations E–G *P. kaida* S. Kurz. Source: *Pflanzenreich: Pandanaceae*; B. Illustration (A) Drupe of *Pandanus drupaceus* Thou., illustration (B) *P. eydeouxia* Balf. (Source: *Pflanzenreich: Pandanaceae*); C. *Pandanus* illustration made in 20th century which focused on the phalange. (Source: New species of *Pandanus* from East Malaysia).

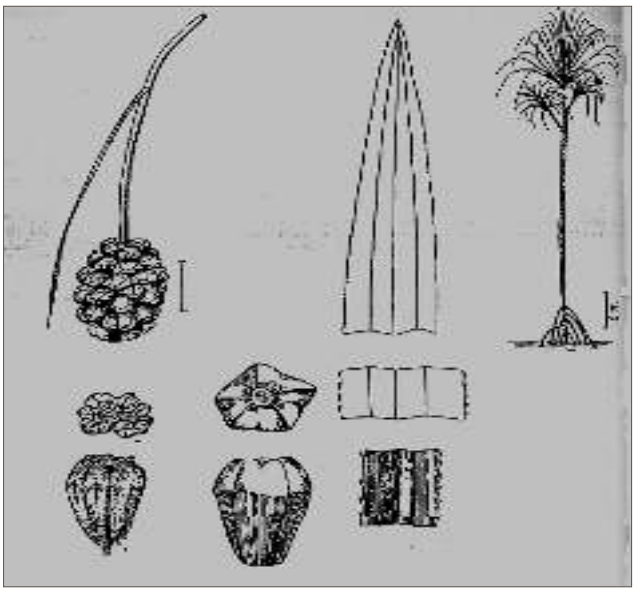

Fig. 5. *Pandanus calatiphorus* by Matthew Jebb. (Source: *A field guide to Pandanus in New Guinea, the Bismarck Archipelago and the Solomon Islands*).

was not finished yet, but it illustrates the process of good handcoloring.

CONCLUSIONS

From the above discussion, it can be said that there are differences in characteristics between *Pandanus* illustrations from the 17th, to the 20th centuries. During the 17th century, *Pandanus* illustrations were detailed, but only showed the main parts of the plant, such as fruit, flower, and stem. In the 18th century, *Pandanus* illustrations showed a detailed depiction of flowers and other plant parts. At the beginning of the 19th century, *Pandanus* illustrations were also detailed and with good coloring. In the 20th century the *Pandanus* illustrations were more even detailed and focused on particular parts of the plant. Illustration was really intended to examine certain parts of the plant more deeply, and in this case only one part of the plant was drawn.

These characteristic differences can be seen from the addition of more plant parts to the illustrations. In addition, more specific parts of the plant were illustrated in more detail in the 19th and 20th centuries. In the 19th century the illustrations of one part of the plant were created because of the interest of the illustrator in that section. In the 20th century, illustrations aimed to be more focused on the area of of interest being studied. In addition, plant illustrations done in the 20th century have more emphasis on scientific purpose, especially for more in-depth examination of the characteristics of each species of the genus *Pandanus*. In the illustration of previous centuries, in order to display the beauty of the plant, it can be seen that plants illustrations were generally made in larger sizes. In addition, delineation of other parts of the plant before the 20th century was only as an informal addition.

We have to make difference between botanical art and botanical illustration. Botanical art is the aesthetically focused art of a botanical object, where botanical art is an interpretation of subject. Whereas the aims of botanical illustration is to study and to understand the details of plants, flowers and other part of plants. It means that, botanical illustration produce not only correct image but a beautiful one as well (Watson & Dallwitz, 1992).

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