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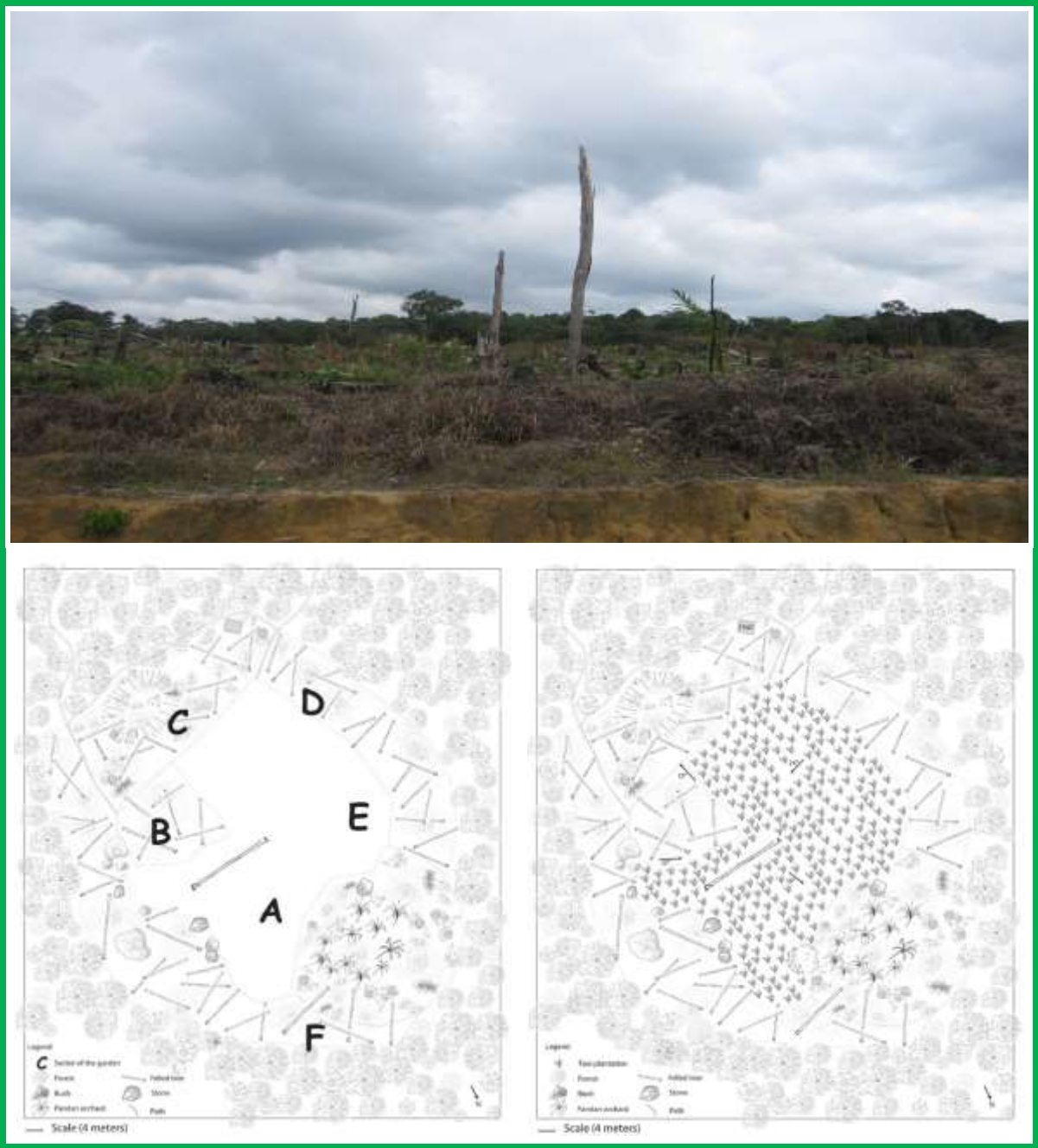

The Ethnobiological Society of Indonesia

An Ethnobotanical Study of *Tongkat Ali* (E*urycoma longifolia* Jack) on Malay Ethnic Group in Tanjung Balai, Karimun, Riau Islands

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ABSTRACT

Tongkat ali (*Eurycoma longifolia* Jack) is one of the tropical forest plants in Indonesia, which is utilized as a raw material in the manufacture of various modern and traditional medicines. However, information regarding the potential and conservation of this plant in indigenous communities in Karimun, Riau Islands has not been well-documented. Therefore, researchers conducted a study in Pongkar Village and Karimun Anak, Tabing, Riau Islands concerning the potential and conservation of *tongkat ali* for the lives of the people in these research locations. Data were collected through an ethnobotanical approach and interviews with selected respondents, traditional healers, village heads, the representative from Karimun Forestry Conservation Office, and local people who utilize this plant in their daily lives. The results showed that the local community utilized *tongkat ali* (*Eurycoma longifolia* Jack) as medicinal ingredients to treat fever caused by malaria, to increase stamina, and to be an alternative source to increase the family's income. In addition, efforts to conduct in-situ and ex-situ conservation supported by the community, indigenous communities, and government agencies are highly needed so that its utilization can be carried out sustainably.

Keywords: Ethnobotany, *tongkat ali* (*Eurycoma longifolia* Jack), local community, Karimun, Tanjung Balai, Riau Islands

INTRODUCTION

Karimun Regency is one of the regencies in the Riau Islands Province, Indonesia. The capital city of Karimun is located in Tanjung Balai Karimun. This regency has an area of 7,984 km^2, with a land area of 1,524 km^2 and an ocean area of 6,460 km^2. Karimun Regency consists of 198 islands. Sixty-seven of them are inhabited. In 2020, this regency has a population of 257,297 people, with a population density of 281.81 people/km^2. It is bordered by Meranti Islands Regency in the west, Pelalawan and Indragiri Hilir Regencies from Riau Province in the south, Malacca Strait in the north, and Batam City in the east (Hutamadi, 2007).

This regency is located at the coordinates 0°35' N - 1°10' S and 103°30' E - 104° E. The area of this regency consists of land and water, with a total area of 7,986 km^2 (BPS Karimun, 2021). The Karimun protected forest area stretches along Mount Jantan and Mount Betina. These two mountains divide two districts in Karimun, namely Pasir Panjang Village

in West Meral District and Pongkar Village in Tebing District. This area is located at the northern tip of Karimun Besar Island. It has the potential of plant resources as medicine and food, both cultivated and uncultivated.

One of the medicinal plants found in the forest and potentially utilized is *tongkat ali* (*Eurycoma longifolia* Jack). Heyne (1950) stated that *tongkat ali* or *pasak bumi* is a beautiful and attractive coastal plant. Mardisiswojo and Harsono (1968) stated that *tongkat ali* is a wild plant that is widely found in Sumatra and Kalimantan in the lowlands to an altitude of 500 m above sea level. The spread of this plant covers Kalimantan, Sumatra, the Malay Peninsula, South Burma, Laos, Cambodia, and Vietnam (Rifai, 1975). In Java, this plant has never been found (Heyne, 1950).

According to Rifai (1975), this plant is generally in the form of a bush or tree. Its height can reach 10 m. It has odd-pinnate compound leaves. Its stem is yellow. The bark is hard. Furthermore, the taste is very bitter. The stems and roots of this plant have been widely traded to Malaysia. They are efficacious for increasing stamina in addition to being a remedy for headaches, stomachaches, and syphilis. The leaves of this plant are used as a medicine for dysentery, canker sores, and increasing appetite (Rifai, 1975).

The purpose of this study was to determine the potential and conservation efforts of *tongkat ali* in its natural habitat and the possibility of disturbance from the local community. The results of this study are expected to reveal the economic potential and its conservation efforts in a sustainable manner to maintain the balance of the ecosystem of the protected forest area of Mount Jantan – Betina and Karimun Anak, Karimun Regency, Riau Islands Province.

METHODS

This study was conducted at the protected forest area of Mount Jantan – Betina and Karimun Anak (01°09'59" N and 103°23'20" E). Administratively, these two research locations are in the area of Pongkar Village (Tebing District) and Pasir Panjang Village (Meral District), Tanjung Balai, Karimun Regency, Riau Islands Province. The protected forest of Mount Jantan – Betina has an area of ± 1,750 ha. The condition of the forest is 75% still covered by primary forest. However, within the area, there is a granite quarry managed by PT. Karimun Granit covering an area of 10 ha, PT. Mirasindo covering an area of 40 ha, and PT. Elips Samanta that are conducting exploration activities for granite potential in the area of the protected forest of Mount Jantan – Betina. Geographically, the Karimun Anak Island is located at the coordinates 00°24'36" N - 01°13'12" N and 103°13'12" E - 104°00'36" E. This island can be reached from Pongkar by using a motorized boat in 30 minutes. According to the village demographic records, the total population of Tabing District, Karimun Regency is 15,255 people with 663 Heads of Families. Furthermore, its population distribution is 264 people/km^2 (BPS Karimun, 2020). Karimun Anak consists of 12 families. People in this location are predominantly Muslim in which their main livelihoods are fishing, farming, and gardening (Figure 1).

The method applied in this study was an ethnobotanical approach, semi-structured interviews, open-ended questions, and direct exploration in the field (Bernard, 2004; Suminguit, 2005; Nolan and Turner, 2011). Information was obtained from selected respondents, such as customary heads, community leaders, the representative from Village Office, and the representative from the Karimun Forestry Conservation Office. This study was conducted in Pongkar Village, Meral District, Karimun Regency, Riau Islands Province,

covering Mount Jantan – Betina. Furthermore, the obtained data were analyzed using the qualitative-descriptive method.

The research location can be reached from Jakarta by Soekarno Hatta Airport to Batam by Hang Nadim Airport. The journey continues to Harbor Bay Batam and then to Tanjung Balai Karimun using a fast ferry boat which takes time for 1 hour and 10 minutes. From Batam City, the research location can be reached from the Sekupang Ferry Terminal to Tanjung Balai Karimun using the Dumai Express passenger ship (± 100 minutes).

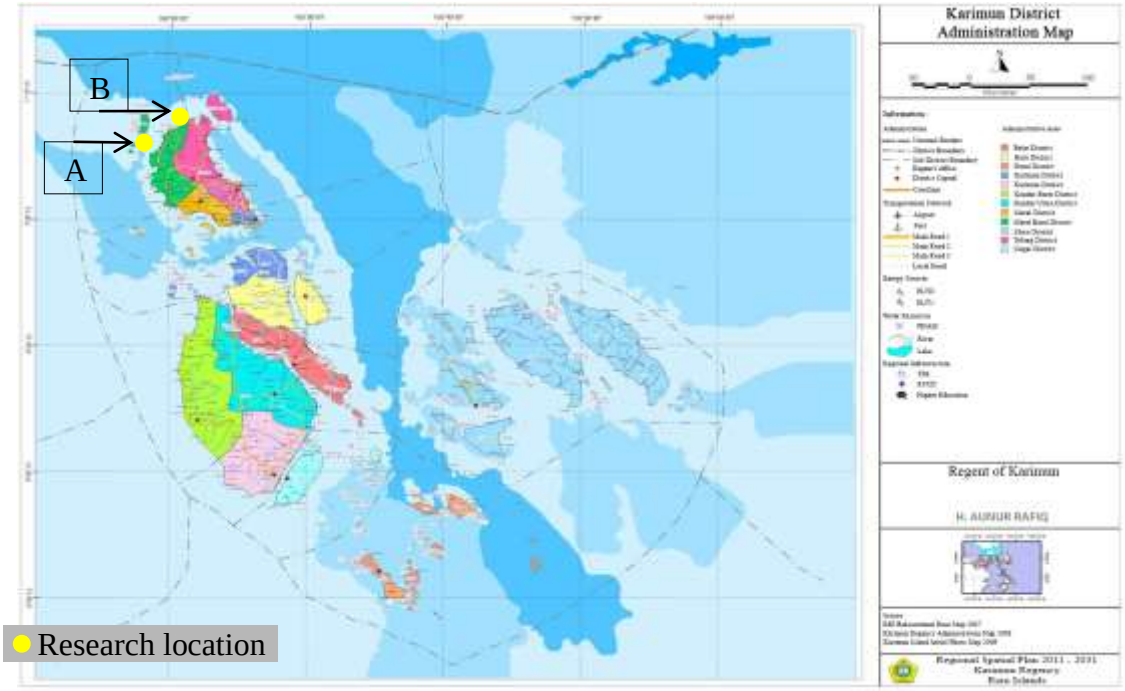

Figure 1. (A) Research location in the protected forest area of Mount Jantan – Betina, (B) Karimun Anak, Karimun Regency, Riau Islands

RESULTS AND DISCUSSION

The Description of Local Community in Karimun Regency

Karimun Besar Island has been inhabited since several decades ago. At that time, it has been inhabited by not only the Malay ethnic group due to the wide-open-free trade. This island has attracted ethnic groups from surrounding islands even from foreign countries, such as Singapore, Malaysia, and China. To date, there are 24 ethnic groups on Karimun Island, in addition to the Malay ethnic group. Since the era of the Sultanate of Melaka, this island has been occupied by Malays. 65% of its population are Malays. The first ethnic group that inhabits this island is the Malay. To date, this ethnic group still maintains Malay customs in Karimun Besar Island. The isolated ethnic groups that are identified and live on the coast of this island are the Akik ethnic group, the Sea Nomads, and the Mantang tribe in Karimun Anak. The main livelihood of these tribes is fishing.

The Potential of *Tongkat Ali* (*Eurycoma longifolia* Jack) in Karimun Regency

Tongkat ali (*Eurycoma longifolia* Jack) plays an important role for the people of Pongkar Village who live around Mount Jantan – Betina and is used as raw material for medicine. The condition of the local community in Karimun can be categorized as a low-income community so that they treat their health by utilizing the plant resources around them. *Tongkat ali* that grows in the protected forest of Mount Jantan – Betina has a dual role. Apart from being a medicine to treat various diseases, it is also an alternative solution to increase the family's economy by selling the roots of this plant to visitors of Pongkar Waterfall on Mount Jantan.

Tongkat ali (*Eurycoma longifolia* Jack) is generally used by local people as a medicine to reduce high fever and increase stamina. They believe that this plant is very efficacious not only for men but also for women to increase strength so that they can work harder. This is closely related to the natural conditions of this island which requires its people to have a lot of stamina. Both men and women must be strong in order to work hard to survive because the Karimun Island has dry climatic conditions in which the rainy season is shorter than the dry season.

The role of *tongkat ali* (*Eurycoma longifolia* Jack) as a medicinal ingredient is closely related to its content of bioactive compounds, in which the main compound found in Simaroubaceae is quassinoids that have a bitter taste (Silalahi, 2015). The Malay community on the Karimun Island utilizes this plant as a cure for high fever (due to malaria) by soaking the root shavings or pieces of the root of this plant with hot boiled water and then cooling it. The soaking water is then drunk. The Malay community in Karimun Besar, such as in Pongkar village or Meral village, believes that this plant with its bitter taste can treat various diseases that they suffer from.

The roots of *tongkat ali* (*Eurycoma longifolia* Jack) contain quassinoid-C20 that has substances of 13$^{\beta}$, 21-dihydroxyeuri-camanol, while its leaves contain quassinoid-C20 that has substances of 13-alpha (21)-epoxy groups (Achmad *et al*., 2008). The results of the bioassay of an alcohol extract from the leaves and stems of this plant show positive activity against the growth of *Salmonella typhi* and *Escherichia coli* bacteria. However, its roots do not show the same thing (Farouk and Benafri, 2007). The ability of leaf extract of this plant to inhibit the growth of *E. coli* supports its utilization as a stomachache medicine. Meanwhile, the ability to inhibit the growth of *S. typhi* is related to its benefits as a fever medicine, especially typhoid fever.

Besides being used as a medicine for fever and stomachache, this plant is also used to increase stamina and is often associated with an aphrodisiac drug. Ang *et al*. (2002) stated that the provision of the extract of this plant can increase the sexual activity of experimental animals and shows a longer coitus time so that it is suitable for usage as an aphrodisiac. Talbott *et al*. (2013) stated that the provision of the root extract of this plant can increase testosterone and cortisone hormones in humans so that it may support its use as an aphrodisiac. Chan *et al*. (2004) and Kuo *et al*. (2003) stated that several quassinoid compounds in this plant, such as eurykamanol and eurykamanol 2-O-$^{\beta}$-Dglucopyranoside, show antimalarial activity against *Plasmodium falciparum*. The content of eurycomanone found in this plant has an anti-cancer effect so that it can inhibit the growth of cancer cells. This plant is also believed to be able to treat inflammation, reduce blood pressure, help to eradicate the plasmodium parasite that causes malaria, and kill bacteria.

Besides using *tongkat ali* as medicine, communities around Mount Jantan – Betina also take this plant for sale. They take this plant directly in the protected forest area of Mount Jantan – Betina. Therefore, this plant with a fairly large stem diameter is rarely found

nowadays. The most commonly found is its tillers during plot sample making. Local people only take this plant that has a quite large trunk diameter and has been tall enough.

Local people do not realize that this plant (*Eurycoma longifolia* Jack) is one of Indonesia's rare plants whose existence needs to be protected. Taking this plant for personal consumption does not actually disturb the protected forest area. However, in reality, it is already in the category of being traded and even is directly taken in nature without considering the condition of existence of this plant. The taking of this plant is due to the very weak economic condition of the local community around the protected forest area of Mount Jantan – Betina. Their livelihoods as fishermen do not meet their daily household needs. This is because the results of fish caught are so little. Therefore, an easy and quick solution to make money is by selling the root of *tongkat ali* (*Eurycoma longifolia* Jack) which they have cut into small pieces and packaged in clear plastic bags with a size of about 250 grams. They sell them for around 20,000 – 25,000 IDR/bag to visitors of the Pongkar Waterfall on Mount Jantan (Figure 2).

Visitors are usually from Malaysia, Singapore, Batam, and the surrounding islands in Karimun Besar Regency. Usually, if they find a root of *tongkat ali* which is large enough in diameter, they sell it for around 150,000 IDR/piece. At present, the condition of the protected forest area of Mount Jantan – Betina needs attention because apart from the exploitation of *tongkat ali*, there are still many other plant species that have considerable potential for being exploited by the local community and also as a source of germplasm that needs attention and protection before the plant is completely extinct.

In addition, one of the informants in this study said that they also received orders for *tongkat ali* (*Eurycoma longifolia* Jack) from neighboring countries, namely Malaysia and Singapore, with a system of depositing money to local people. After receiving the money, they use it for accommodation to search for *tongkat ali* in the protected forest area of Mount Jantan – Betina. After getting the requested plants, they send them to the destination country by using an expedition service. The informant also said that he even once sent this plant to Java because of market needs on this island.

The protected forest area of Mount Jantan – Betina is the only protected area on the Karimun Besar Island, which is the mainstay of Karimun people as a source of clean water that can support the life of people in the Karimun Besar Island. Therefore, it is highly important to protect the plants contained in it from exploitation, especially if those plants have the potential and benefits for people's lives in Karimun Besar Island and its surroundings.

Figure 2. (A) Photo of *tongkat ali* being traded in the chopped form, and (B) Photo of *tongkat ali* being traded in the form of bars (complete)

The Conservation of *Tongkat Ali* (*Eurycoma longifolia* Jack) in Karimun Regency

Tongkat ali (*Eurycoma longifolia* Jack) is one of 30 rare plants in Indonesia (Rifai, 1992). The expansion of the region and the opening of access to coastal tourism resulted in increasingly congested traffic and tourist visits from neighboring regions, such as Malaysia, Singapore, and surrounding islands. Many of them visit beach tourism sites and Pongkar Waterfall in the protected forest area of Mount Jantan. Local people take advantage of this by marketing *tongkat ali* (*Eurycoma longifolia* Jack) to visitors on the side of the road and the entrance to the Pongkar Waterfall in the protected forest area of Mount Jantan. Because the number of buyers is increasing, the local people around the protected forest area are more often entering the protected forest area to take more *tongkat ali*. Therefore, when the researchers conducted a field survey of *tongkat ali* (*Eurycoma longifolia* Jack), this plant with a quite large diameter was a bit difficult to find. They only found the saplings of *tongkat ali* (*Eurycoma longifolia* Jack) (Figure 3).

Figure 3. Photo of the sapling of *tongkat ali* (*Eurycoma longifolia* Jack) in the protected forest area of Mount Jantan

The local community has tried to do ex-situ conservation outside the habitat of this plant by taking seedlings in the protected forest area of Mount Jantan – Betina, with a total of about 300 saplings. These saplings were then planted outside the habitat of this plant, namely in the yard of the house of those local people. After one year, only two trees can grow. Based on the results of interviews conducted with the informants, it indicated that there has been no counseling from the relevant agencies regarding the technique of cultivating *tongkat ali* (Figure 4). It is highly needed so that local people can develop *tongkat ali* outside the habitat of this plant, not taking them directly from nature anymore. This is in line with the statement from Rifai (1992) that species conservation efforts are highly needed through plant propagation. In addition, it is necessary to provide assistance and counseling to the surrounding community to utilize *tongkat ali* by ex-situ cultivation and not to take it from protected forest areas.

Figure 4. Photo of the cultivation of *tongkat ali* by local people

CONCLUSION

The local Malay community in Pongkar Village, Tebing, Meral and residents in Karimun Anak, Karimun, Riau Islands utilize *tongkat ali* (*Eurycoma longifolia* Jack) as raw material for medicine. *Tongkat ali* is used as a malarial fever medicine and an aphrodisiac drug for men. In addition to being utilized for personal use, local people also use this plant as an alternative solution to increase the family's income by selling the root of this plant to tourists who visit the Pongkar Waterfall.

Taking *tongkat ali* in the protected forest area of Mount Jantan–Betina simultaneously and excessively will result in the extinction of this plant. Therefore, it highly needs joint efforts to carry out conservation both in-situ and ex-situ supported by the local community and relevant government agencies. In order for maintaining the existence of *tongkat ali* (*Eurycoma longifolia* Jack), it is necessary to make sustainable use and conservation efforts together so that it has added value in a sustainable manner.

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CONTENTS