I. INTRODUCTION

1.1 Background

Daemonorops is one of the genera in the Arecaceae family, which is the second largest rattan genus after Calamus. The genus *Daemonorops* has more than 120 species (Rustiami et al., 2011), one of which is *Daemonorops draco* (Willd.) Blume, also known as rattan jernang. Jernang rattan is commonly found in Sumatra (Jambi, Riau and Bengkulu) (Rustiami et al., 2004). This species can produce resins that are of high economic value (Mahlinda et al., 2020).

The resin of jernang rattan (*Daemonorops draco*) holds high economic value due to its wide range of uses. The Anak Dalam tribe in Jambi utilizes jernang resin for various traditional medicines, including treatments for headaches, toothaches, childbirth, fever, and diarrhea. It is also applied to wounds, as the resin is believed to stop bleeding (Mairida et al., 2016; Yetty et al., 2013). Today, jernang resin is used as a raw material for medicines (with antibacterial, anticancer, antiviral, anti-inflammatory, and antioxidant properties), dyes, incense, and varnishes (Mahlinda et al., 2020; Waluyo & Pasaribu, 2013). There are 42 types of active chemical compounds contained in dragon's blood resin, with the characteristic compound of dragon's blood being Dracorhodin (Waluyo, 2013).

Recently, the demand for Jernang rattan resin has been increasing, leading to a rise in its selling price. The selling price of Jernang rattan resin at the local market level in Jambi ranges from Rp. 400,000 to Rp. 800,000, with some even reaching Rp. 30,000,000 per kilogram (Asra et al., 2020). However, market demand remains unmet

due to the declining wild population of Jernang rattan, primarily caused by land-use changes that result in habitat destruction (Asra et al., 2020), leading to stagnant regeneration of the species (Asra et al., 2012).

To preserve the natural source of Jernang rattan resin, the Anak Dalam Tribe (SAD) community began cultivating jernang rattan in 2008 within the Bukit Duabelas National Park (TNBD). They planted the rattan beneath rubber trees, which serve as support for the climbing jernang vines (Sulasmi et al., 2012). The parent jernang plants were fenced using bulian or ironwood (*Eusideroxylon zwageri*) to ensure longer durability (Asra et al., 2020).

In the conservation and breeding program for the rattan plant, one of the main steps that can be taken is the provision of seedlings. Rotan Jernang is a dioecious plant, meaning that it has separate male and female plants and does not have secondary sexual characteristics. The species of the rotan Jernang plant generally develop sexually during the adult phase, which takes 5-7 years to appear (Naqvi et al., 2021). To regulate the correct sex ratio in the rattan population, it is important to identify the gender of the seedlings to be planted.

In the genus *Daemonorops*, no studies on sex chromosomes have been reported, so the identification of sex in these plants uses molecular markers. There are several molecular markers that can be used to identify the sex of a plant, such as Rapid Amplified Polymorphic DNA (RAPD) and Simple Sequence Repeats (SSR), Amplified Fragment Length Polymorphism (AFLP), and Inter Simple Sequence Repeat (ISSR). In this study, ISSR markers were used to find specific male and female bands. Inter Simple Sequence Repeat or ISSR uses microsatellite primers of 16-25 bp

in length, which can detect various loci randomly like RAPD, and have a high polymorphic rate (Reddy et al., 2002). ISSR has several advantages compared to other methods, such as ISSR not requiring information about the targeted sequence because it is random, the binding of ISSR primers is directed by simple sequence repeats, and the target sequences are abundant throughout the eukaryotic genome. ISSR also evolves rapidly (Asra et al., 2014).

ISSR markers have been widely successful in distinguishing between male and female individuals in dioecious plants (Mansyurdin, 2024). Some dioecious plants that have successfully differentiated male and female individuals using ISSR markers include *Calamus tenuis*, *Calamus flagellum*, and *Calamus thwaitesii*, which were detected using primer RT-29 (Sarmah et al., 2017), and *Phoenix dactylifera* which used primers IS-A02 and IS-A71 (Al-Ameri et al., 2016). Based on the success rate of the use of ISSR primer in sex identification in various types of Arecaeae plants, primer selection will be carried out for sex identification in *Daemonorops draco* (Willd.) Blume uses this ISSR method.

1.2 Research Problem

In efforts to conserve and cultivate Jernang rattan, it is necessary to provide male and female seedlings to determine the balance of sex ratio in a population. Male and female sex in Jernang rattan plants cannot be known in the seedling phase because Jernang rattan plants do not have secondary sex. Therefore, it is necessary to identify sex in rattan Jernang molecularly. Based on the above, the research problem in this study is as follows:

1. Which ISSR primer can produce a sex-specific band consistently present in either all male or all female individuals of Jernang rattan (*Daemonorops draco*)?

1.3 Research Objectives

Based on the research problem above, the objectives of this study are as follows:

1. To select an ISSR primer that generates a sex-specific DNA band unique to either male or female *Daemonorops draco* individuals, enabling molecular sex identification.

1.4 Research Benefits

The findings of this study are expected to contribute to advancing knowledge on gender identification using the ISSR method. Additionally, the results can be applied to identify male and female seedlings during the seed phase, supporting conservation and cultivation programs.