I. INTRODUCTION

1.1 Background

Jernang rattan (*Daemonorops draco* (Willd.) Blume) is one of the 12 types of *Daemonorops* that produces the best resin (Rustiami et al, 2004; Soemarna, 2009). Resin or jernang sap is used as a wound medicine, toothache remedy, postpartum medicine, and paint dye by the Suku Anak Dalam (Yetty et al., 2013). Mahlinda et al. (2020) state that jernang resin is utilized as an antibacterial, anticancer, antiviral, anti-inflammatory, dyes, incense, and varnish. The resin is rich in primary secondary metabolites such as flavonoids and terpenoids as well as saponins, glycosides, and steroids/triterpenoids (Arnone et al., 1990; Nasini & Piozzi, 1981; Wulandari et al., 2021). Based on its benefits and content, the resin from *D. draco* has a high selling price, reaching Rp 3,000,000 per kg at the collector level and Rp 10,000,000 in the export market, proving that jernang has great potential to contribute to the country's foreign exchange (Fitriandi et al., 2020; Harnov et al., 2016).

D. draco is only distributed in Jambi, Riau, and South Sumatra (Rustiami et al., 2004). However, its habitat is starting to degrade due to land conversion into palm oil plantations (Sulasmi et al., 2024), excessive exploitation, and logging without considering the sustainability aspects of the *D. draco* in the wild (Lestari et al., 2017; Kurian et al., 2018). This has caused a decline in the population of *D. draco* (Schmidt et al., 2020). Therefore, conservation and cultivation of *D. draco* are necessary to address this issue.

In situ conservation efforts have been carried out by the Suku Anak Dalam (SAD), an indigenous tribe residing in the Jebak Forest of the Bukit Dua Belas National Park (TNDB), who utilize forest resources sustainably (Harnov et al., 2017; Sulasmi et al., 2012). Additionally, the cultivation of *D. draco* has also begun in secondary forests, which is more ecologically and economically beneficial for conservation efforts, as the cultivation of *D. draco* does not require land clearing activities. This is because the surrounding trees are used by *D. draco* as climbing supports (Harnov et al., 2017; Asra et al., 2021). In the conservation and cultivation program of *D. draco*, there are two main challenges faced: the limited availability of seeds and the provision of male and female seedlings for this dioecious plant.

Seeds are limited because the fruits are harvested while still young for the extraction of the highest quality resin (Antonius & Putri, 2022). Identification of male and female seedlings cannot be performed before entering the generative phase because the plants do not have secondary sexual characteristics that can differentiate male and female plants morphologically at the seedling stage (Asra et al., 2012; Choong & Wickneswari, 2016). The fruit of the *D. draco* in female individuals will only appear when the plant is 3-4 years old (Yetty et al., 2013). Identification through sex chromosomes is difficult because the sex chromosomes in the Arecaceae family are not clearly visible (Siljak-Yakovlev et al., 1996; Intha & Chaiprasart, 2018).

One of the effective approaches to use is the molecular approach. This is because the most effective, fast, and reliable approach for determining sex regardless of reproductive age is the molecular approach (Dhawan et al., 2013). The molecular approach to determining the sex of dioecious plants began with the Random Amplified

Polymorphic DNA (RAPD) and Simple Sequence Repeats (SSR) techniques, and later developed with Inter Simple Sequence Repeat (ISSR) and Amplified Fragment Length Polymorphism (AFLP). The advantage of RAPD compared to other techniques is that it can be performed without prior information about the target DNA, produces polymorphic bands, and is more efficient (Hadrys et al., 1992).

RAPD markers successfully identified the sex of dioecious Arecaceae plants with primer S1443 on *Calamus simplicifolius* (Yang et al., 2005), primer OPAU-02 on *C. travancoricus* (Priya et al., 2019), primers OPC-06, OPB-18, OPC-19, OPA-02, OPJ-09 on *Phoenix dactylifera* (Al-Qurainy et al., 2018; Intha & Chaiprasart, 2018; Hassan et al., 2020; Mohammed and Mohamed, 2019; Younis et al., 2008; Dhawan et al., 2013), primers OPO-17 and OPAP-20 on *Salacca edulis* (Ediwirman, 2015), primer OPAC-11 on *S. zalacca* (Li et al., 2015). Based on the effectiveness of RAPD in plants, particularly in the Arecaceae family, RAPD primer selection will be conducted for sex identification in *D. draco*.

1.2 Research Problem

Jernang Rattan (*Daemonorops draco*) is a dioecious plant, meaning it has separate male and female individuals. The sex of this plant can only be determined once it has flowered for the first time. This becomes a problem in the cultivation and conservation of *D. draco*, because only female *D. draco* plants produce fruit for utilization. Therefore, if the sex is not known from the beginning, it will be difficult to manage productivity in the cultivation process. The most effective approach to determine sex regardless of reproductive age is the molecular approach. One of the markers that has been successfully developed for plant sex identification is RAPD. Based on this, the

research problem formulation is which RAPD primers have male and/or female-specific bands in *D. draco.*

1.3 Research Objective

The objective of this research is to obtain primers that have specific bands for female or male sex through RAPD primer screening.

1.4 Research Benefit

The expected benefit from the results of this research is to add information about sex-specific bands from RAPD primers. These sex-specific bands have the potential to be developed for sex identification in *D. draco*. Thus, they will help in providing male and female seedlings to support the conservation and cultivation programs of *D. draco*.