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# Propagation and growth of persimmon (*Diospyros kaki* L.) in Indonesia

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**Abstract.** Persimmon is a rare fruit plant in Indonesia. Its growth and development are very interesting how the plants multiply were not clearly understood. This study aimed to determine the vegetative (root shoots) propagation and growth of persimmon. The method used a purposive sampling method with surveys to various regions in Central Java and East Java. The persimmon breeding was conducted at Greenhouse of the Faculty of Agriculture, Universitas Sebelas Maret. The results showed that the growth of persimmon by root shoots was very slow, which can be seen by the appearance of relatively long leaf buds about 3-4 weeks after planting.

## 1. Introduction

*Diospyros kaki* L. is a plant originating from subtropical countries. This plant has adaptable, so that persimmon can be found in tropical regions, such as Indonesia [1]. Persimmon is usually found in highland areas such as in Brastagi (North Sumatra), Cikajang (West Java), Temanggung, Magelang, Boyolali (Central Java), Magetan, as well as Batu and Malang in East Java [2]. Persimmon can grow well at an altitude of 1000-1500 m above sea level with high rainfall, indicated that persimmon require a cool and humid climate.

The spread of persimmon in Indonesia which is quite extensive makes this plant have good prospects to be developed as superior fruit suitable for cultivation. However, the fact that persimmons have not been cultivated on a large scale in Indonesia. Many persimmon production centers that only come from the people's yard or from the community forest. To increase the potential diversity of persimmon resources, good management and utilization of biodiversity is needed. Starting from nurseries and fertilization need to be monitored properly.

Persimmon can be divided into two species, namely persimmon fruit (*Diospyros kaki*) which has no seeds and persimmon fruit (*Diospyros hasseltii*) with seed [3]. Of these two types, seedless persimmon is the most widely known by the people of Indonesia. Therefore, in general, persimmon cultivation is propagated vegetatively through root cuttings or grafting, because the roots of persimmon are found in many buds and can grow into mature plants. The advantages of these root cuttings are that they are easy to apply and fast in the supply of seeds.



## 2. Methods

### 2.1. Location and time of research

The research was carried out in two stages: persimmon survey and breeding. Persimmon surveys were carried out in Boyolali and Magetan regions. Root cuttings and persimmon observations were carried out at the Greenhouse Faculty of Agriculture, Sebelas Maret University. The research takes place during January-July 2018.

### 2.2. Research design and data analysis

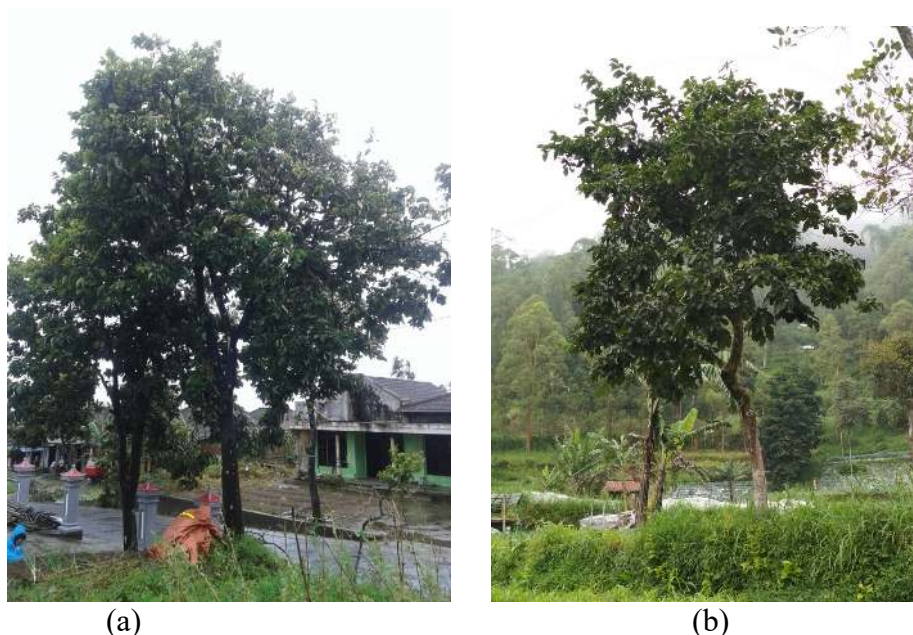
The research was designed as *Completely Randomized Design* with two factors, namely the origin of persimmon plants and accession of persimmon plants. The variables observed in this study were age of buds, number of shoots, number of leaves, leaf area, plant height and percentage of living plants.

## 3. Results and discussion

### 3.1. Location of survey

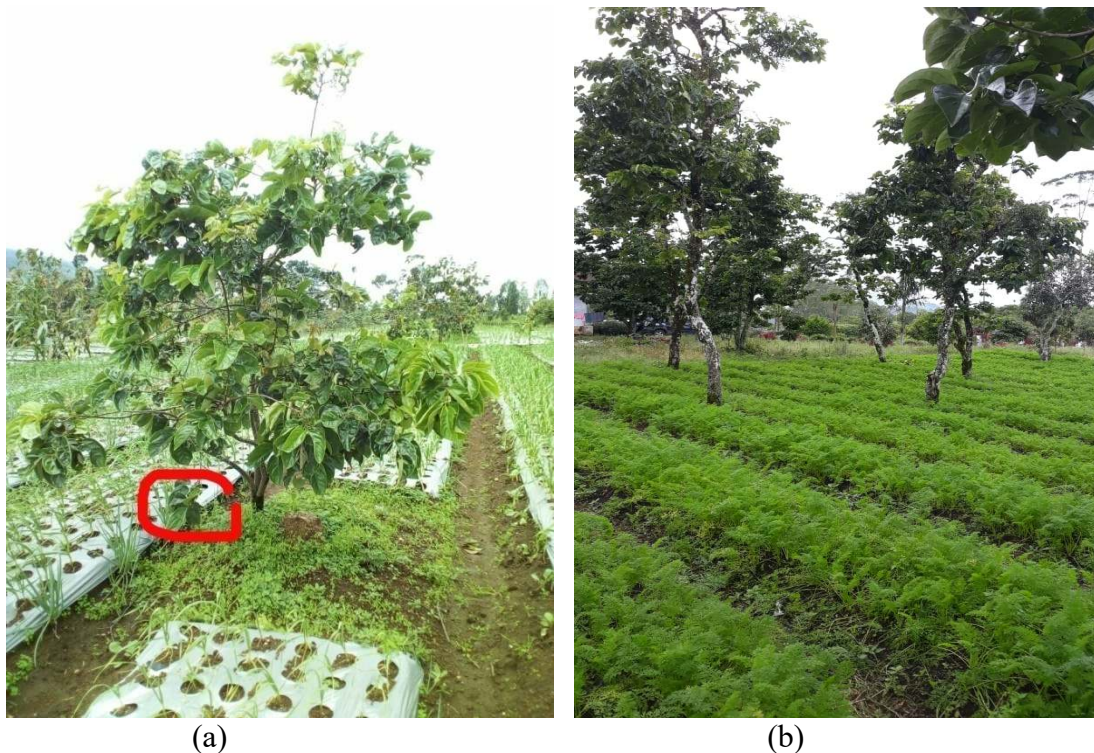
The survey was conducted in two places, namely Boyolali and Magetan. The location of the Boyolali persimmon plant were in Gebyok, Sepandan Lor, Senet, and Jarakah Villages in Selo District. Whereas in Magetan the survey was done in the Singolangu and Sarangan Village in Sarangan District. The persimmons mostly grow in the moor or the yard of the surrounding people's home, where these plants function as windbreakers. During the dry season, this plant will abort its leaves along with persimmon that has been ripe and picked.

Topographically, large part of Boyolali Regency is a lowland with an altitude of 75-400 m above sea level (asl) and partly a plateau with altitudes more than 700 m asl. The average rainfall is around 2.000 millimeters/year. Boyolali persimmon plants is located in Selo which is a highland area in Boyolali Regency with an altitude between 1,300-1,500 m above sea level. The average temperature in this area is between 18-22° C. Persimmon growth will be optimal in the highlands with an altitude above 1.000 m asl [4]. Sarangan District in Magetan is also a highland area with an altitude of 1.000 masl with average temperature of 16-20 °C.



**Figure 1.** (a) Persimmon Boyolali and (b) Persimmon Magetan

In addition to persimmon plants in these two regions, this persimmon survey was also conducted in Temanggung and North Sumatra (Brastagi). Persimmons in Temanggung and North Sumatra are also located in the moor. In Temanggung, this plant has been cultivated as a plantation crop and managed by the Environmental Agency with the plant ages around 5-7 years old. However, there are already areas that care about the scarcity of these plants so they are cultivated. Differently, in North Sumatra (Brastagi), there is an absence of special treatment or good care of these plants by the surrounding community (allowed to grow on the sidelines of the main plant). This is because of the lack of knowledge of the surrounding community about harvesting the right fruit so that it can be consumed by the community.



**Figure 2.** (a) Persimmon Temanggung and (b) Persimmon Sumatera Utara (Brastagi)

### *3.2. Location of nurseries and research observations*

Persimmon nurseries were conducted at the Greenhouse of the Faculty of Agriculture, Sebelas Maret University with the average temperature around 24-32°C. However, because persimmon requires cool and humid conditions, the greenhouse was furnished with paranet to maintain the microclimate conditions (Figure 3).



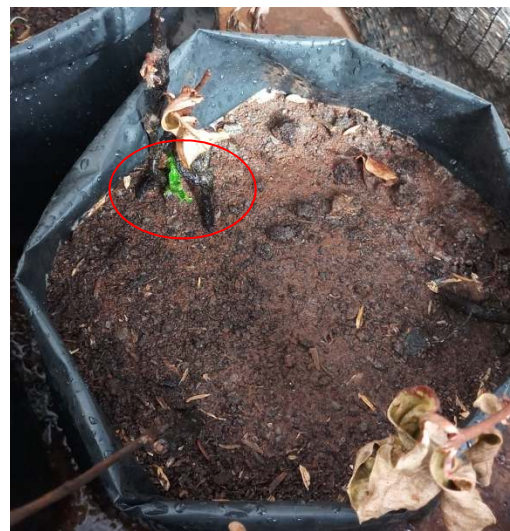


**Figure 3.** Place of nursery persimmon

Persimmon nurseries are carried out using root shoots from healthy persimmon brood stocks. The media used were sand: soil: manure with proportion of 2: 1: 1. This plant was planted in polybag and each polybag is filled with 3 root shoots.



(a)



(b)

**Figure 4.** Persimmon shoots

Figure 4 shows that seeded persimmon plants appear buds 3-4 weeks after planting. The appearance of shoots on each persimmon plant seed taken from the root buds is not simultaneous. It is possible that each root shoot eye taken has its own response to the growth of shoots.

#### 4. Conclusion

Vegetative propagation of persimmons (root cuttings) is less efficient because the slow growth of persimmon plants.

#### Acknowledgement

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