

A Simplified Cultivation Technology for Disbudding of (*Hevea brasiliensis*) Stock Seedling

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Abstract

A new simplified cultivation technology which could facilitate rootstock bud of rubber stock seedling was studied. The advantages of the technology were that it could be was simple to operate and used easily. Using telescopic handle and arcuate edge effectively could reduce labor intensity of seedling breeding workers and improve the speed of disbudding. Further, bag budling could be promoted healthy growth and its survival rate could be improved with the technology.

Keywords

Simplified Cultivation, Speed of Disbudding, Labor Intensity, Disbudding

1. Introduction

Natural rubber, steel, petroleum and coal are known as the four industrial raw materials. It is an important strategic material; natural rubber industry has developed into basic industries with people's livelihood. Engaged in rubber tree planting has become an important way of world tropical areas of rural development and farmers to get rich. According to 2012 statistics, China's rubber tree acreage has more than 1.1 million hectares, the annual output of 795,000 tons dry rubber [1], rubber tree planting and management has become a regional characteristic industry of tropical Hainan, Yunnan and Guangdong. Based on current growth and rubber plantation rubber plantation area of the normal annual update rate, China's annual update of new species and 40,000 hectares of rubber plantation, according to 600 ha⁻¹, the annual 24 million seedlings will be provided, and rubber seedlings economic effects are increasingly apparent [2] [3]. With the rapid development of economy, agricultural labor

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force, labor costs rise rapidly. Kinds of plastic with an aging workforce and labor costs have become increasingly prominent, and have an impact on the development of rubber seed production cannot be ignored. Simplify the production of rubber saplings cultivated areas and reduce labor intensity is particularly urgent.

Container growing seedling method is currently the most widely used rubber tree nursery methods. Rubber container seedlings planted in the field has more advantages in the following: firstly, it has no obvious corrosion at the seedling stage, faster recovery growth, can shorten the field of non production period. Secondly, it is not strictly required, high survival rate of planting time. Finally, the root system is more complete, with a strong ability of wind resistance and drought resistance. Rootstock seedlings will be budding when rootstock to budding standard and will be cut back after survival. Stem leaf bud, scale bud and dense nodal bud below kerf will germinate after cut back. As a result of its apical dominance, rootstock bud grows quickly. If above rootstock bud can not erase seasonably, these bud will not only reduce consume large amounts of nutrients, but also will inhibit the scion bud germination, seriously affecting the growth of the scion budding. Therefore, it is important to debud rootstock bud for seedling survival rate and healthy growth of container seedling.

Rootstock buds emerge erase with finger or cut with a knife are commonly production methods at present. Disbudding are required to bend over or squat is able to complete, high labor intensive and inefficient. Therefore, in order to solve the current shortage of rubber container seedling disbudding technology and reduce the labor intensity of rubber seedlings in container management work and improve work efficiency. Rubber container seedling disbudding problem is to carry out research in this paper.

2. Material and Methods

2.1. Making Materials of Measurement

This is one round wooden rod with diameter from 30 mm to 40 mm. This is one steel ring with length from 400 mm to 500 mm and width from 250 mm to 300 mm and the thickness from 15 mm to 20 mm. an arc-shaped steel knife pooh with the length from 150 mm to 200 mm.

2.2. Manufacturing Method of Measurement

Developed rubber seedling rootstock shoots erase making device according to the following steps:

- Step 1: selection of smooth straight wooden handle as a round bar one;
- Step 2: the production of steel ring to handle sets 2;
- Step 3: set the handle 1 and the handle 2 is connected and fixed;
- Step 4: the arc-shaped steel knife blade Bah made into 3;
- Step 5: the front end of the cutter body 3 four arcuate edges;
- Step 6: the cutter body 3 connected to the handle sleeve 2 is fixed.

The device diagram is shown in [Figure 1](#).

2.3. Device Usage

It can be adjusted according to the distance disbudding work and rootstock long arm length bud area handle when the device is used. The user holds the handle with normal standing posture, and then knife edge will close to the stem and rootstock bud will be cut. Disbudding work is completed.

3. Results

This simplified cultivation technology is suitable for different height users standing use and convenient disbudding operation. The user does not need to adopt bending or squatting posture in the disbudding in the process.

The arc-shaped knife edge effectively guarantee the edge circumscribed in nearly cylindrical rootstock, and it can accurately realize the buds and operation, and better protection of the stem bark of budding on piles. At the same time, the Knife edge occupies small space and easy to move, and which is conducive to the operation of disbudding. 600 rubber seedlings for rootstock bud operating time, disbudding speed comparison test conducted, comparing the results reflect the benefits of the device ([Table 1](#)). Thus, the above method can effectively improve the disbudding speed and labor efficiency, and promote the healthy growth of the scion.

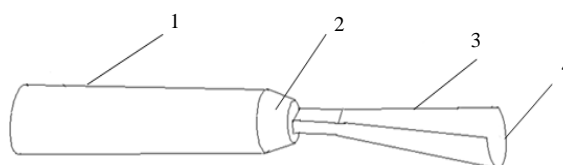


Figure 1. Schematic diagram of rootstock bud of rubber seedling budding disbudding. Note: 1: handle; 2: handle sets; 3: cutter body; 4: Blade.

Table 1. Methodology comparison between special equipment and conventional (600 samples).

Treatments	Time/min	Disbudding speed (one·min ⁻¹)
Conventional	21	≈29
Special equipment	13	46

4. Discussion

Rootstock buds management is seldom reported in the *Hevea brasiliensis* seedling breeding production worldwide, and the practice of disbudding is rough. Southeast Asian countries such as Malaysia, rubber planting approach is gifted with a pumping rootstock shoots removed, in order to ensure the ability to focus on the growth of the scion bud, but it is not specific enough disbudding method [4]. Although Philippines and Ivory Coast have mentioned to the timely removal rootstock buds, but its specific operation described is lack [5] [6]. Previous reports have been related to disbudding of rubber seedlings but it is a lack of specific method description [7]-[9]. Chinese rubber seedling breeding workers generally use hand or a knife to get rid of rootstock buds, but workers need to bend over or squat to complete the disbudding work. The method has some problem such as high labor intensity, slow speed and low efficiency [10] [11].

Comprehensive analysis of the results showed that the simplified cultivation technology for disbudding of *Hevea brasiliensis* stock seedling has some advantage as fellow. Firstly, the simplified cultivation technology can be applied to the field of agricultural production widely; the technology is not only suitable for the application in the rubber tree production areas, but also suitable for use in other fruit and forest production field. Secondly, the simplified cultivation technology could be simple to operate for forestry seedling breeding workers and the technology is suitable for being widely popularized and applied in the field of forestry production. Fourth, the simplified cultivation technology could be used easily for forestry seedling breeding workers. Then the materials of measurement about the simplified cultivation technology has easy material source. Further, the manufacturing method of measurement is simple and easy to learn.

5. Conclusion

The results of this study showed that disbudding method made rubber container growing seedlings disbudding work became labor-saving, light simplified. It can reduce the labor intensity and improve labor efficiency for seedling production work. The technology can also be used to remove buds that stem shoots after rubber seedlings planted appear in a height of 3 metres from the ground.

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