Scarification's Effect on the Growth of *Leucaena Leucocephala* cv Taramba

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Abstract. The aim of this study is to reveal a method for accelerating seed germination and raising the growth of *Leucaena leucocephala* cv Taramba. The research was conducted in the agrostology laboratory of the Indonesian Research Institute for Animal Production (IRIAP) from June to August 2021. The research method used a completely randomized design with three treatments and ten replications, with thirty plant units in one replication. The treatments were as tries to follow: P0: un - treated seeds (control), P1: sanded seeds, and P3: seeds soaked in warm water. The seeds of Leucaena leucocephala cv Taramba were soaked in hot water, sanded, and controlled before germination. Germination levels for each treatment were 25.29, 23.31, and 23.56% respectively. The germinated seeds were placed in polybags to grow and develop. Scarification was found to be significantly different ($P < 0.05$) depending on the number of leaves. Plant height, leaf length, and leaf width were not significantly different ($P > 0.05$).

Keywords: Feed · Leguminosae · Plants

1 Introduction

Leucaena leucocephala-grass pastures produce significantly more beef and profit than grass-only pastures and annual forage crops. When compared to perennial grass pastures and other sown forages, it has the potential to significantly increase beef production and profitability [1]. The rapid expansion of leucaena use for cattle fattening in eastern Indonesia is expected to have a significant positive impact on household incomes as well as regional economic growth [2]. Lamtoro varietas Tarramba (*Leucaena leucocephala* cv. Tarramba) has the advantage of being flea and drought resistant, but it is unknown if it will grow well in the range of soil acidity [3]. Using plant morphological characteristics and media pH, Leucaena leucocephala cv. Taramba is resistant to aluminum stress at a concentration of 100 ppm aluminum (pH 5.5) [4]. Planting tree legumes as a source of highly nutritious food is the best choice for dry land with dry climates Lamtoro plants thrive in the tropics. Planting tree legumes as a source of highly nutritious food is the best choice for dry land with dry climates. The dry matter, crude protein, fat, and NDF contents of young forage lamtoro taramba were 19.10, 34.57, 2.23, and 38.6%, respectively [5]. Fresh forage production of *Lamtoro tarammba* in the Sumbawa area

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can reach 12 kg per tree, with livestock consuming more than half of it [6]. Lamtoro is also used as forage as a calcium and phosphorus mineral source [7].

Seed germination is critical information to have when growing a plant. The percentage of individuals that germinate when tested (germination) is an important determinant of seed quality [8]. Internal factors (such as genetic characteristics, growth potential, skin condition, and initial seed moisture content) and external factors both influence seed germination (seed packaging, gas composition, storage space humidity and storage time) [9, 10]. Seed scarification is one of the seed pretreatment methods used to break dormancy and accelerate seed germination [11]. *Lamtoro Taramba* seeds face a few challenges in order to germinate quickly. One of them is the seed coat, which is so thick that it takes a long time to germinate. This makes uniform growth difficult. Dormancy is the inhibition of the seed germination process caused by the physical condition of the seed. Physical, mechanical, and chemical treatments can be used to break the dormancy of seeds. Soaking in either cold or hot water is one of the physical treatments used to break seed dormancy. The immersion treatment for lamtoro seeds provides the fastest growth rate because the water and oxygen required for germination can enter the seed embryo without being hindered, allowing the seeds to germinate [12, 13]. The purpose of this study is to determine the effect of scarification (hot water, sandpaper, and control) on sprout germination and growth.

2 Materials and Methods

The study was carried out in the Indonesian Animal Research Institute's agrostology laboratory from June to August 2021. The seeds of East Nusa Tenggara's *Leucaena leucocephala* cv Tarramba were used in the study. The germination test was performed in the first stage using three treatments: seeds soaked in hot water, sanded, and control. After the seeds germinate, they are transferred to polybags for observation in the greenhouse. The study used a completely randomized design (CRD) with three treatments and ten replications, with thirty plant units in each replication unit. The following parameters were observed: germination percentage, plant height, number of leaves, leaf width, and leaf length.

The germination calculation was performed from the time the seeds germinated until no seeds germinated. When roots emerge from the seeds, stems and leaves form, the seeds are referred to as sprouts. The percentage of germination was calculated using the following formula:

$$\% \text{ Germination} = \left(\sum \text{Germination seed}\right) / \left(\sum \text{Total seed in petri dishes}\right) \times 100$$

Data of the observations were analyzed using analysis of variance. If there was a real effect, Duncan used SPSS 16 to conduct additional tests.

3 Results and Discussion

3.1 Germination Percentage (%) Leucaena Leucochepala cv Taramba

In general, the physiological condition of lamtoro Leucaena leucocephala cv Tarramba seeds with plain water (control) and sandpaper soaking is lower than that with hot water

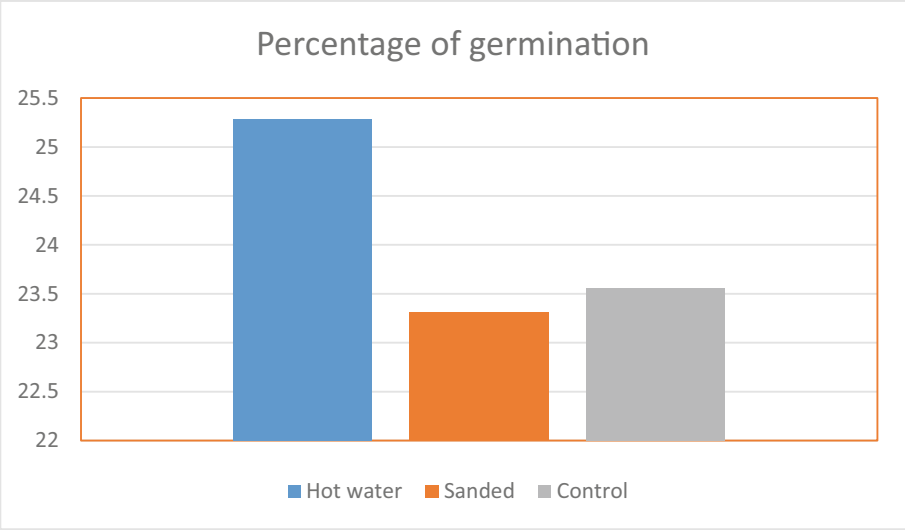

Fig. 1. Percentage of germination

immersion. Soaking in hot water has a 25.29% success rate, while scarification with sanding and control have rates of 23.31 and 23.56%, respectively. This is demonstrated by a higher percentage of normal sprouts with hot water immersion compared to ordinary water immersion. This condition indicates that the 60 °C hot water treatment stimulates normal germination by breaking dormancy by heating the lamtoro seeds, causing the lamatoro seeds to grow completely, with intact cotyledons, radukula, hypocotyls, and plumules. Soaking in hot water encourages germination.

This is demonstrated by a higher percentage of germination after 10 min of immersion in hot water at 60 °C compared to 24 h of ordinary water immersion. This is presumably because hot water treatment can stimulate germination, allowing lamtoro Tarramba to grow. The hot water immersion treatment improves the seed coat's ability to absorb water, allowing the lamtoro seed coat to soften. The process of softening the skin facilitates imbibition and does not obstruct water entry into the seed embryo, allowing proper germination to occur. Hot water can hasten the process of softening the seed coat, making it easier to germinate normally (Fig. 1).

3.2 Sprout of Growth

According to Fig. 2, the average yield of the highest germination height was in the pulp treatment, followed by hot water and control, at 21.22, 20.14, and 18.75 cm, respectively. The highest leaf width was in the sandpaper treatment, hot water, and the lowest in the control, namely 8.22, 7.59, and 7.61 cm. The longest leaf lengths in hot water, sandpaper, and control were 6.22, 6.15, and 5.70 cm, respectively. Scarification treatment had no statistically significant effect ($P > 0.05$) on sprout growth. Scarification treatment only had a significant ($P < 0.05$) effect on the number of leaves, where the sanding treatment

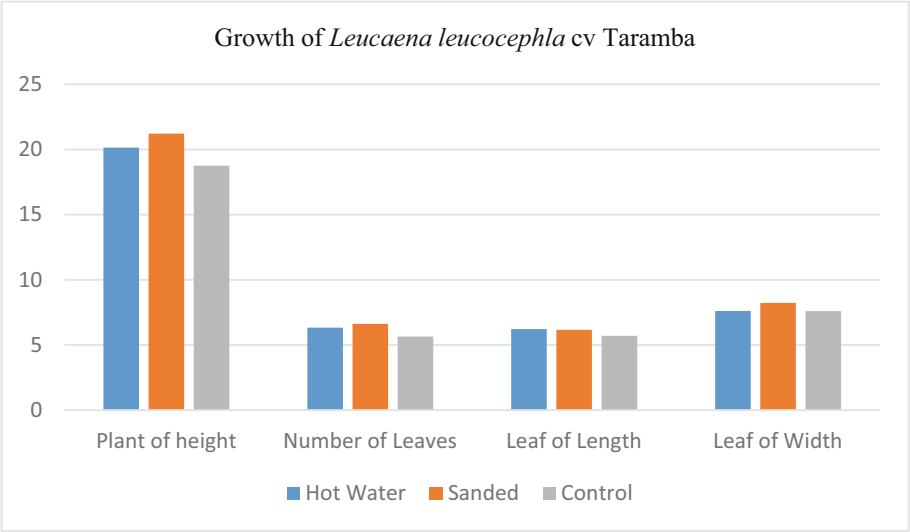

Fig. 2. Growth of *Leucaena leucocephala* cv Taramba

used sandpaper, followed by hot water, and then control, with 6.62, 6.32, and 5.64 strands, respectively.

4 Conclusions

Scarification with hot water results in the most germination; scarification treatment influences the number of leaves on Lamtoro Taramba.

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