

The germination
patterns of dicot and
monocot seedlings
breaking dormancy of
ipil...



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The Germination Patterns of Dicot and Monocot Seedlings, Breaking Dormancy of Ipil-Ipil Seeds (*Leucaenaleucocephala* L.) and Storage of Orthodox and Recalcitrant Seeds¹ Monique Balitian Bobby Ching Charles John Gunay Jojoxxxxx Group 2 Section Y-1L March 19, 2013 1A scientific paper submitted in partial fulfillment of the requirements in Fundamentals of Crop Science I laboratory under Mr. Arlan James D. Rodeo, 2nd sem. , 2012-2013

INTRODUCTION Seeds are the specialized parts of the plants that results to a new plant. They provide a site of food and shelter for it.

Because of the process called germination, matured seeds can be able to sprout. Germinating seeds absorbs great amount of water. This water initiates different chemical processes that will occur inside the seed. This is also the reason why the seeds' internal tissues swell, causing the seed coat to break. Seeds have a high respiration rate, thus need ample but sufficient amountamount of oxygen. Respiration allows the germinating seed to break down food and convert it to energy essential for growth. Germination varies its complimentary temperature. Though, a lot of seeds want low temperature when it will germinate.

In general, germination requires abundant water, ample amount of oxygen and suitable temperature depending on the type of seed (World Book Encyclopedia, 1997). There are two kinds of germination: hypogeal and epigeal germination. For hypogeal germination, the epicotyl elongates leaving the cotyledon under ground while for epigeal germination, the hypocotyl is the one that gets longer and pushes through the soil (Roberts and King , 1987). However, there are times when viable seeds fail to

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germinate even at favorable conditions of moisture and temperature. This is called seed dormancy.

Through ages, there are seeds having a hard coat that do not let them absorb water they need for germination. Although, there have been a lot of methods that enables the coats permeable (The Encyclopedia Americana, 1976). Some methods used to break dormancy are scarification, temperature treatments, light treatments and treatments with regulators and chemicals. Scarification destroys the hardness of the coat physically or chemically. For temperature treatments, seed can be either be placed to low temperature (0 - 5OC), 40 - 50OC or be soaked at 80OC temperate water.

Some seeds cannot germinate in the absence of light, thus it should be treated with spontaneous exposition of light. Moreover, for an endogenous dormancy, it must be treated with little amount of growth regulators (My Agricultural Information Bank, 2011). This study was conducted last February 26, 2013, observed until March 5, 2013 at the University of the Philippines Los Banos, Agronomy Building, Crop Science Cluster Room 138. The study aimed to determine the germination pattern of dicot and monocot seedling, break dormancy of ipil-ipil seeds (*Leucaenaleucocephala* L. and study the storage of orthodox seeds and recalcitrant seeds. The specific objectives were to determine and compare the germination pattern of a dicot and monocot seed corresponding to hypogeal and epigeal germination, determine the efficiency of mechanical scarification- through rubbing on sandpaper and clipping with respect to breaking dormancy of *Leucaenaleucocephala*L. seeds, and effect of initial moisture content on the

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storability of rice seeds and determine the storability of recalcitrant seeds.

METHODOLOGY In evaluating the germination, dormancy and storage of seeds different procedures were done.

In seed germination, a dicot and a monocot seed were chosen to represent seeds exhibiting epigeal and hypogeal germination, respectively. Fifty seeds were germinated in moist filter paper inside a container. For one week, the germination pattern were observed everyday and an illustration of day-to-day observations was then plotted. Roots and shoots length (cm) were also obtained for each day. The average length of five seedlings were then computed and indicated in a table. In breaking dormancy of *Leucaena leucocephala* (ipil-ipil) seeds different treatments were used. Eighty seedlots of ipil-ipil were divided into four equal portions.

Each treatment has ten seeds and replicated two times. In the first treatment, seeds were rubbed on a sand paper. In the second treatment clipping was done by using a nail cutter to remove the part of the seed coat. Third treatment was done by soaking the seeds in hot water (50°C) for ten minutes and last was the untreated or control. For each treatment, a germination test was conducted using the rolled paper technique. The germination samples were placed inside a polyethylene bag to conserve its moisture. The treatments were checked periodically and supplemented if needed. After one week, the seeds that germinated were counted.

The number of normal seedlings and the percentage of germination were computed by dividing the number of normal seedlings by the total number of seeds sown and multiplied by one hundred. In the effect of initial moisture <https://assignbuster.com/the-germination-patterns-of-dicot-and-monocot-seedlings-breaking-dormancy-of-ipil-ipil-seeds-leucaenaleucocephala-l-and-storage-of-orthodox-and-recalcitrant-seeds1-essay/>

content on the storability of rice seeds, two seedlots of rice were obtained at the same harvested time. One seedlot was dried to a moisture content of eighteen to twenty percent and another dried to moisture content of fourteen percent and below. Seeds were kept three months in paper bags at ordinary room condition. Germination test conducted for both treatments using fifty seeds replicated two times.

A rolled filter paper technique was used and germination samples were kept inside polyethylene bags. The first three counts were made after three days and final count at seven days. Percentage germination were computed and results compared. In storability of recalcitrant seeds, *Theobroma cacao* (cacao) fruit was divided into two equal parts. The seed was extracted and cleaned. The first treatment was consisting of freshly extracted seeds while the other treatment was stored for one week under ordinary room condition. Using sand as medium, ten seeds were germinated for each treatment and replicated twice.

After one week, the germinated seeds counted and percentage of germination computed. Three tables comparing the percentage of each activity were then plotted and analyzed. TABLE 1. 1SHOOT AND ROOT LENGTH OF A MONOCOT SEEDLING| SHOOT LENGTH (cm)| ROOT LENGTH (cm)| DAY| 1| 2| 3| 4| 5| AVE| | 1| 2| 3| 4| 5| AVE| DAY 1| 0| 0| 0| 0| 0| 0| | 0| 0| 0| 0| 0| DAY 2| 2| 2. 1| 2| 1. 8| 2| 1. 98| | 1. 5| 1. 25| 1. 6| 1. 3| 1. 5| 1. 43| DAY 3| 4. 0| 4. 5| 3. 5| 4. 0| 4. 5| 4. 1| | 3. 5| 3. 5| 3. 8| 3. 0| 4. 0| 3. 56| DAY 4| 7. 0| 7. 25| 7. 0| 6. 75| 6. 5| 6. 9| | 6. 5| 7. 0| 6. 5| 7. 0| 6. 5| 6. 70| DAY 5| 7. 5| 7. 25| 7. 5| 7. 0| 7. 5| 7. 5| | 6. 5| 7. 0| 7. 0| 7. 5| 6. 75| 6. 95| DAY 6| 8.

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75| 8. 75| 9. 0| 9. 0| 9. 5| 9. 00| | 8. 5| 8. 5| 8. 0| 7. 9| 8. 5| 8. 28| DAY 7| 9. 5|
9. 5| 9. 0| 9. 8| 10. 5| 9. 66| | 11. 0| 9. 5| 10. 5| 10. 5| 9. 0| 10. 1| Figure 1. 1.

Germination pattern a monocot seed. Table 1. 2Shoot and root length of

dicot seedling (soybean)| SHOOT LENGTH (CM)| ROOT LENGTH (CM)| DAY| 1|
2| 3| 4| 5| AVE. | | 1| 2| 3| 4| 5| AVE. | 1| 0| 0| 0| 0| 0| 0| | 0| 0| 0| 0| 0| 0| 2| 0|
0| 0| 0| 0| 0| | 0| 4| 5| 19| 6| 6. 8| 3| 0| 0| 0| 0| 0| 0| | 0| 15| 20| 30| 20| 17| 4|
0| 0| 0| 0| 0| 0| | 0| 40| 35| 38| 10| 24. 6| 5| 0| 0| 0| 0| 0| 0| | 70| 0| 12| 35| 50|
33. | 6| 0| 0| 0| 0| 0| 0| | 60| 45| 25| 25| 23| 35. 6| 7| 0| 0| 0| 0| 0| 0| | 25| 15|
5| 25| 15| 17| Figure 1. 2. Germination pattern of a dicot seed. RESULTS AND

DISCUSSION for Activity 2. Breaking dormancy of ipil ipil seeds As seen in
Table 2a, results showed that the ipil ipil seeds treated by clipping (removing
part of the seed coat using nail cutter) had the most number of normal seeds
among all the treatments. Those seeds treated by rubbing on sandpaper and
the untreated or the control, both produced the same number of normal
seeds. While those seeds treated by soaking in a hot water (50?), did not
produced normal seeds.

Computing for the percent germination, the seeds treated by clipping still
had the higher percent germination (35%) than other treatments; both seeds
treated by rubbing on sandpaper and the control had 30% germination rate
while those seeds treated by soaking in hot water had 0 percent germination
rate (showed in table 2b). The difference between the four treatments is
clearly represented in the graph (Figure 2). Thus, mechanical scarification (i.
e. clipping and rubbing on sandpaper) greatly influenced the percent
germination of the ipil ipil seeds than physical scarification (soaking on hot
water).

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This observed high number of normal seeds because of mechanical scarification can be explained through the following mechanisms. According to Lars Schmidt, "... mechanical scarification of the seed-coat by piercing, nicking, clipping, filing or burning with the aid of a knife, needle, file, hot wire burner, abrasion paper or the like is usually considered the most effective way of overcoming physical dormancy. Since each seed is handled manually, it can be given individual treatment according to the thickness of the seed-coat. It is often used as a reference method to which the effectiveness of other methods is compared.

Virtually all seed can be made permeable, and the risk of over-treatment. "

This may also be the reason why there is high percentage of germination of ipil ipil seed, treated under mechanical scarification. Table 2. Number of normal ipil ipil seedlings (out of ten) after one week. Treatment| No. of seeds germinated| | Trial 1| Trial 2| Rubbing on a sandpaper| 2| 4| Clipping| 4| 3| Soaking in hot water (50 ?)| 0| 0| Control| 3| 3| Table 3. 1. Number of rice seeds germinated (out of 25) after one week. TREATMENT| REPLICATION| | TRIAL1| TRIAL2| AVERAGE| 11% MOISTURE CONTENT| 5| 17| 11|

Table 3. 2. Effect of initial moisture content on the storability of rice seeds treatment| % GERMINATION| | REPLICATION| | 1| 2| AVE| 11%moisture content| 20%| 68%| 44%| Table 3. 2a. Number of cacao seeds germinated Treatment| REPLICATION| | | 1| 2| AVE| Freshly extracted seeds| 5| 5| 5| Stored for one week| 0| 0| 0| Table 3. 2b Storability of recalcitrant (cacao) seeds Treatment| % germination| | REPLICATION| | 1| 2| ave| Freshly extracted seeds| 100%| 100%| 100%| Stored for one week| 0%| 0%| 0%|

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LITERATURE CITED * My Agricultural Information Bank (2011). " Methods of Breaking Dormancy".

Retrieved from <http://agriinfo.in/default.aspx?page=topic&rid=3&topicid=81> * (1976). The Encyclopedia Americana International Edition (Vol. 24, 516-518). Canada: Americana Corporation. * (1997). The World Book Encyclopedia (International) (Vol. 17, 235-237). United States of America: World Book, Inc. * Crop Science Cluster (2012). Crop Science 1: Laboratory Manual. Los Banos: College of Agriculture University of the Philippines Los Banos. * Roberts M. B. V. and King, T. J. (1987). Biology a functional approach: Student's Manual 2nd edition. United Kingdom: Thomas Nelson and Sons Ltd.