Ministry of Agriculture, Livestock and Irrigation
Department of Agriculture
Seed Division

Study on Dormancy of Different Rice Varieties

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Introduction

Paddy

- Staple food crop of more than 60% of the world population covering 156 million ha with a production of 650 million tonnes.

Seed Dormancy

- Resting stage of embryo with low germination of viable and freshly harvested grains
- Seed dormancy creates problem for seed analysis and seed producers.
- Qualitative and genetically inherited trait whose intensity is modified by the environment during seed development (Naylor, 1983)
- Problematic in agriculture as it affects plant establishment but it is the ability of the seeds to delay their germination until the time and place are right are reflecting and important survival mechanism in plants.

Introduction

Seedling Vigour Index

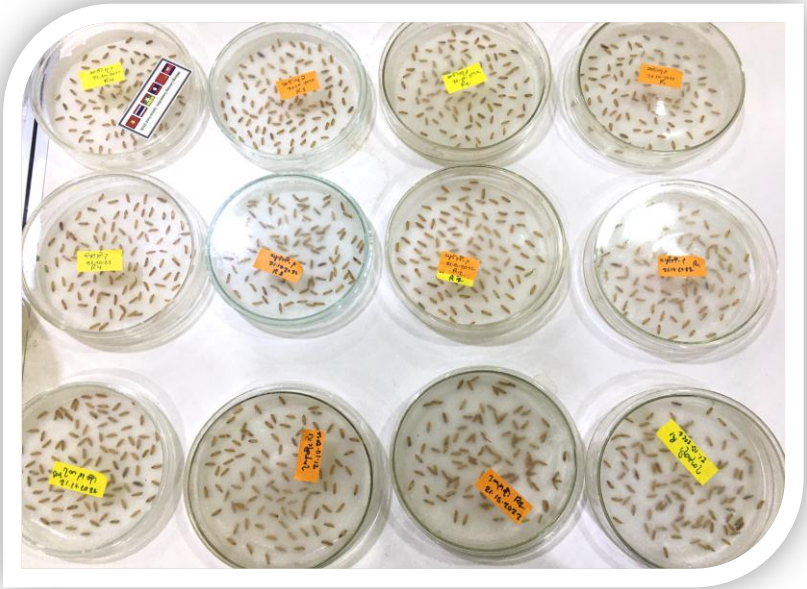
- Ability of a seed to emerge rapidly from soil or water, mainly reference to seed germination rate and early seedling growth (Huang et al,2004)
- Seeds with high vigor is important for rice production because it can not only significantly enhance seedling establishment, (Luo et al.2007) but also improve the capability to compete against weeds at seedling stage (Rao et al, 2007)

Problem Statement

- Presence of seed dormancy in paddy is both problematic as well as advantageous.
- It is problematic for post harvest seed testing and it is advantageous in avoiding viviparous germination in tropical cultivars grown during monsoon season.
- The premature germination of seeds within ears/pods (vivpary) occurs when the crops are exposed to a wet weather favorable for germination just before harvest.
- Seed producer and farmer confuse the dormancy and inability to germinate
- Farmers often encounter poor germination due to seed dormancy. Hence, it becomes necessary to investigate the presence of dormancy in paddy cultivars before sowing.

Objectives

- To study the dormancy of different rice varieties
- To share the information related with rice seed dormancy to farmers and plant breeders



Materials and Methods

- Place – Seed Testing Laboratory

  (Nay Pyi Taw)

- Time – 2022-2023 Rainning Season
- Seed Class – RS
- Experimental Design - CRD
- Replication - 4

- Treatments - Varieties

  T1. Sinthukha (Hmawbi Seed Farm)

  T2. Hmawbi-3 (Poundte Seed Farm)

  T3. Yadanartoe (Poundte Seed Farm)

  T4. Manawthukha (Pwint Phyu Seed Farm)

  T5. Ayeyarmin (Hmawbi Seed Farm)

  T6. Pawsan Baykyar (Thayaung Chaung Seed Farm) (Traditional)

Materials and Methods

Data Collection

1. Just after harvest

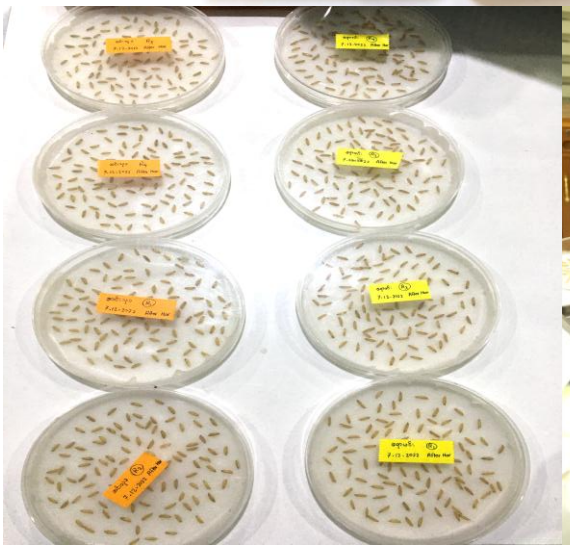
2. Sun Dry (Moisture Content around 13%)

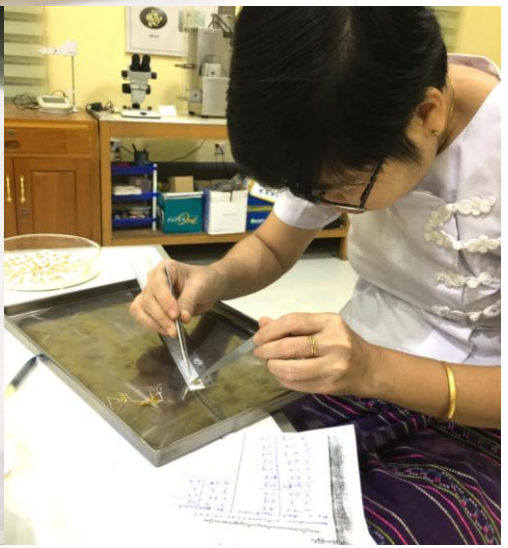
3. Air Dry (Moisture Content around 13%)

Materials and Methods

Variables

- Moisture content (%)
- Germination Percentage (%)
    1. First count (7th day)
    2. Second count (14th day)
- Seedling Length (cm)





Materials and Methods

Seed Germination (%)

$$\text{Seed germination (\%)} = \frac{\text{No.of seeds germinated}}{\text{Total no. of seeds}} \times 100$$

- Germination was recorded on the 7^{th} and14^{th} days based on normal seedlings produced the germination percent was worked out.

Seedling Vigour Index (SVI)

Seedling Vigour Index(SVI) = Germination (%) x Seedling Length (cm) (Ali.etal.,2018)

Results and Discussion

- The result show that of the tested varieties have seed dormancy immediately after harvest
- Minimum germination percentage of Registered Seed (R.S)class is (85 %)

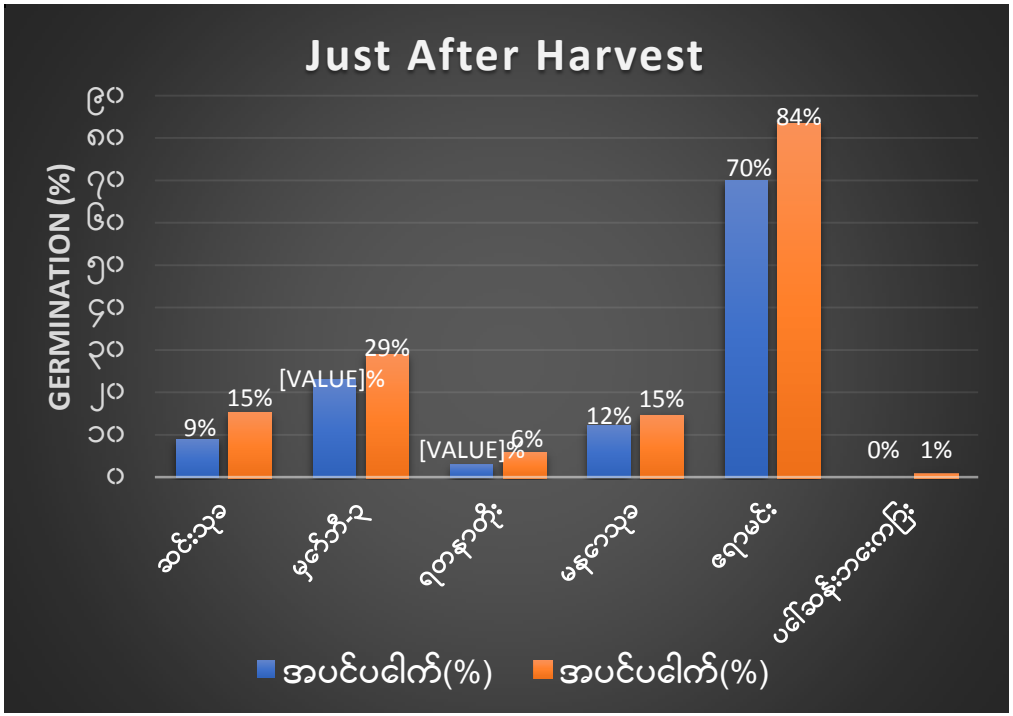


Figure 1. Germination % of different rice varieties just after harvest

အကြောင်းအရာ	ဆင်းသုခ	မှော်ဘီ-၃	ရတနာတိုး	မနောသုခ	ဇရာမင်း	ပေါ်ဆန်းဘေးကြား
Just After Harvest	16.6	15.5	18	20.33	15	19.86
Air Dry	13.7	12.97	13.4	12.53	13.8	13.6
Sun Dry	13.2	12	13	12	13	12.1

Table 1. Moisture Content of Different Rice Varieties under Different Conditions

Results and Discussions

- Germination percentage of Hmawbi-3 and Yadanartoe varieties increase after reducing moisture content by air dry
- Sinthukha, Manawthukha and Pawsan Baykyar rice varieties still have dormancy after air dry condition

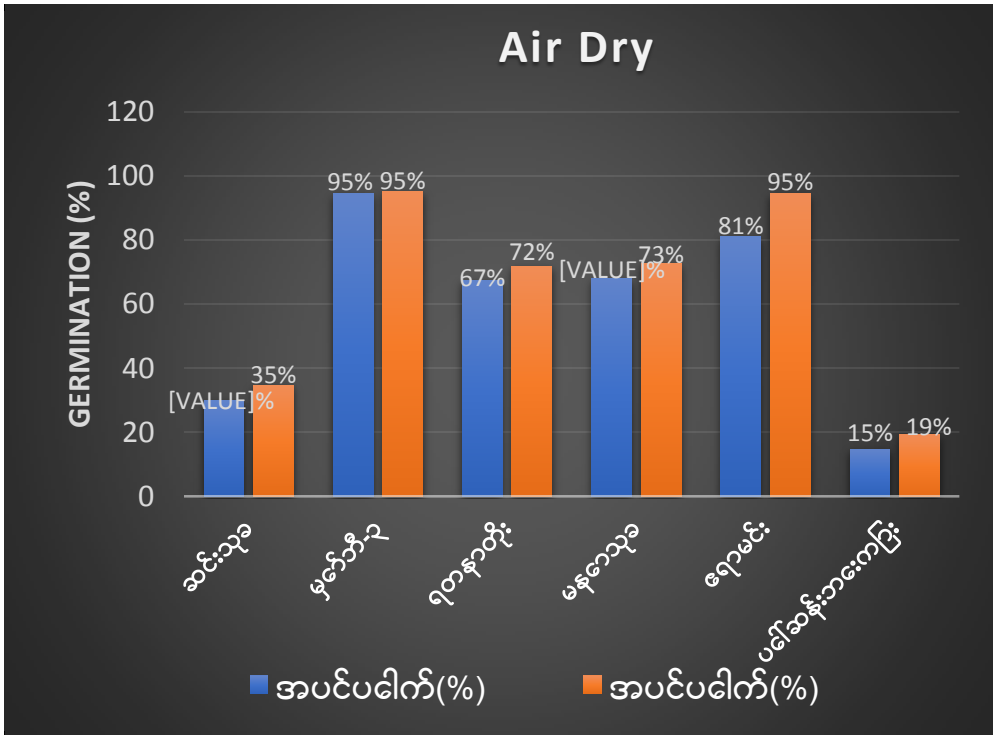


Figure 2. Germination % of different rice varieties under air dry condition

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Results and Discussion

- When we study the performance of Sinthukha and Pawsan Baykyar, germination percentage is below (50%) under sun dry conditions. So, these varieties can be considered to have **strong dormancy** compare with other tested varieties.

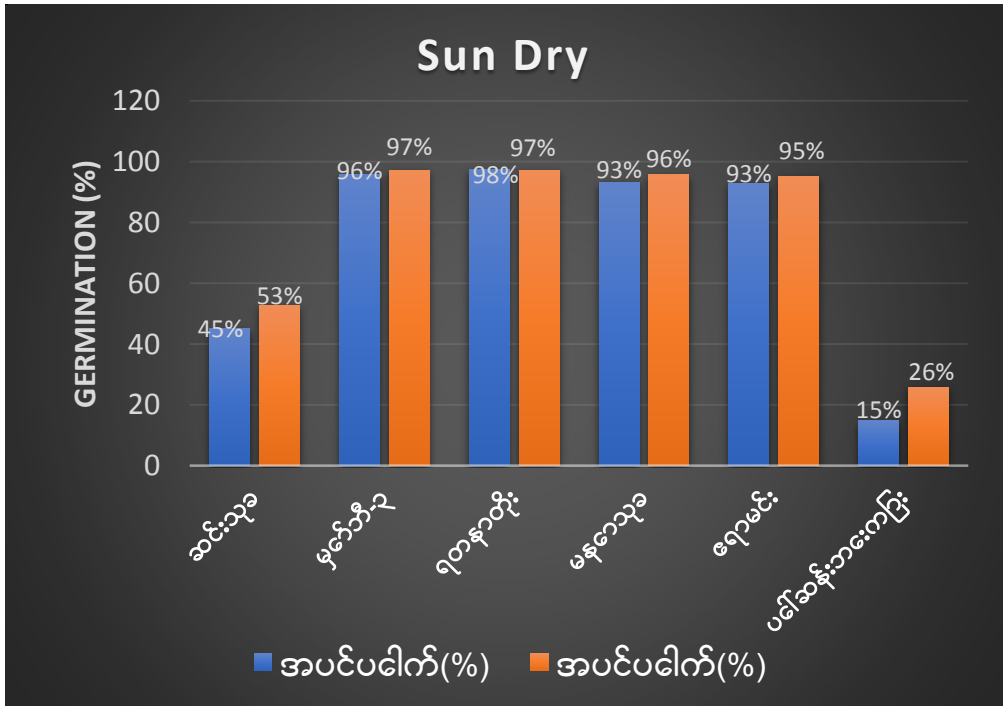

Figure 3. Germination % of different rice varieties under sun dry condition

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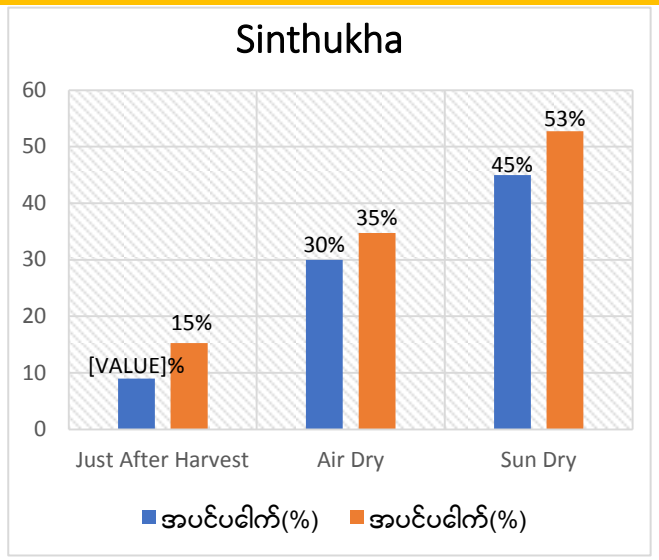
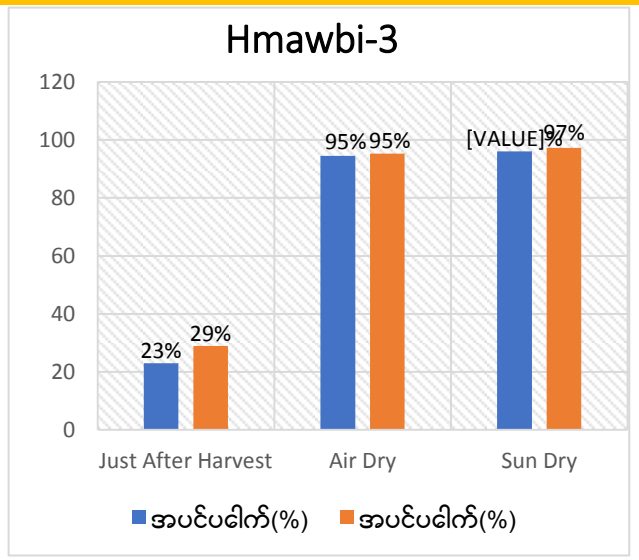
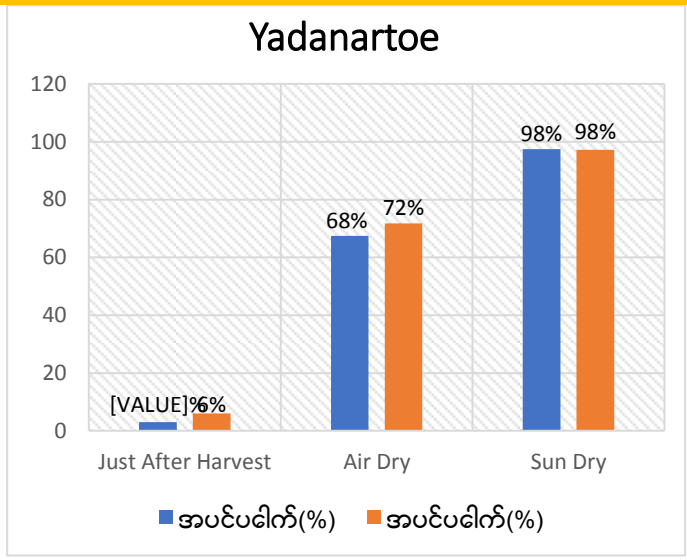
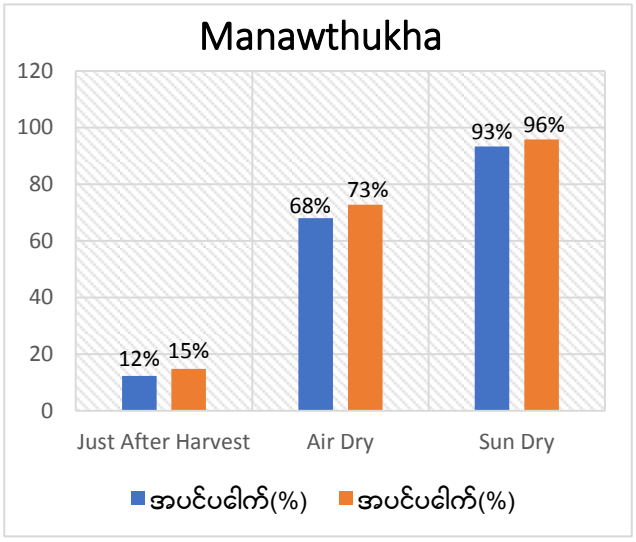
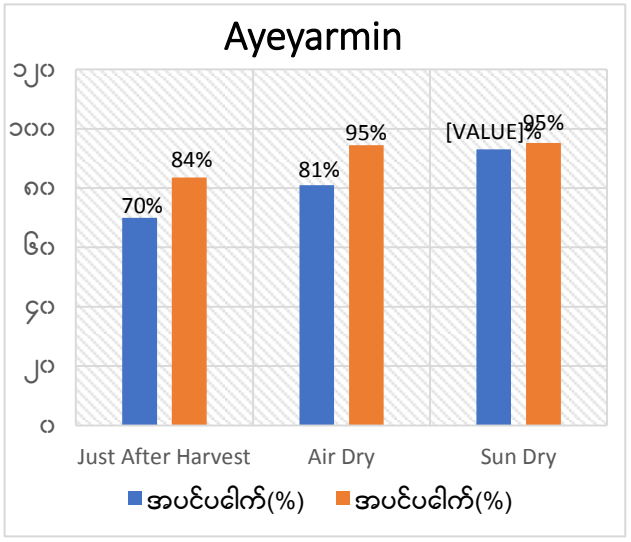
Results and Discussion











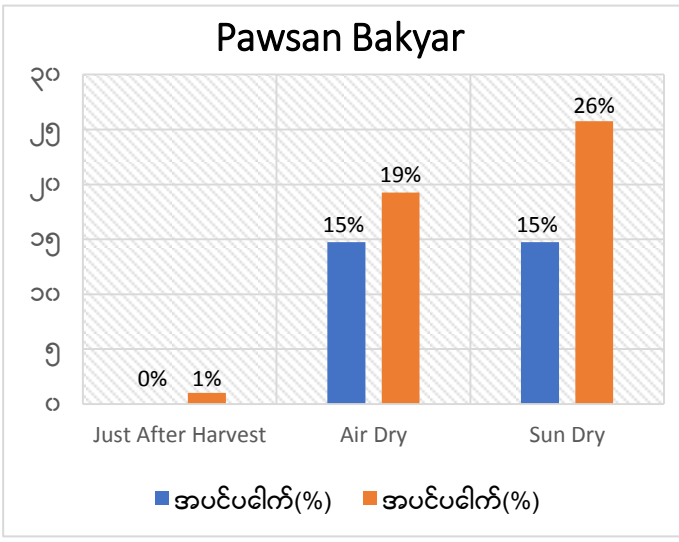


Figure 4. Germination % of different rice varieties under different conditions

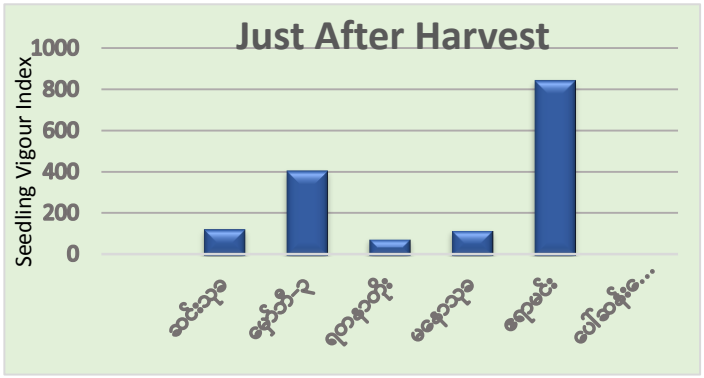


Figure 5. SVI of different rice varieties just after harvest

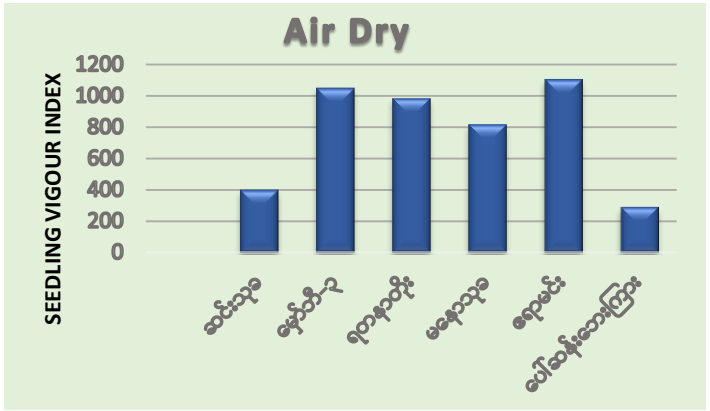


Figure 6. SVI of different rice varieties under air dry

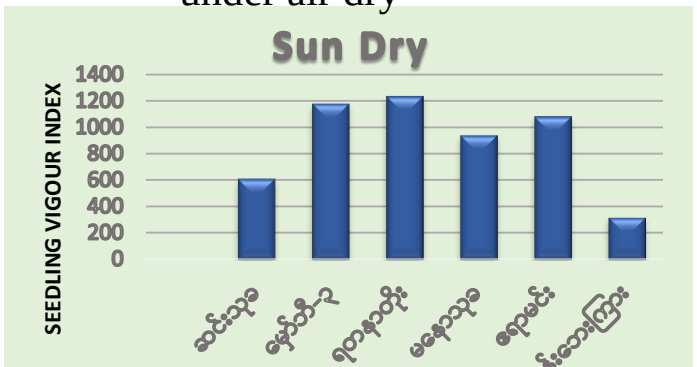


Figure 7. SVI of different rice varieties under sun dry

Results and Discussion

- Observed similar to the trend of germination percentage.
- Ayeyarmin is the highest follow by Hmawbi-3, Sinthukha, Manawthukha, Yadanartoe immediately after harvest.
- Under air dry condition, Ayeyarmin showed the highest seedling vigour index it is not significantly different from Hmawbi-3 and Yadanartoe. Pawsan Baykyar showed the lowest.
- It is surprisingly that SVI of Yadanartoe revealed that the highest under the sun dry condition.
- Under sun and air dry conditions Pawsan Baykyar showed the lowest value.

Conclusion

- The tested varieties showed low germination percentage immediately after harvest
- The germination percentage increased after reduction of seed moisture content
- The seedling vigor index (SVI) of Pawsanbaykyar rice variety showed the lowest value
- It can be concluded that Pawsanbaykyar rice variety germinate the lowest plant population showing that it has strong dormancy than other tested varieties

Future Plan

- Dormancy duration of different rice varieties
- Environmental effect on seed dormancy

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Thank You