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Germination Response on Storage of Chinese Milk Vetch Seeds

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Objective

This study was to investigate the germination response on storage and to determine the treatment for breaking dormancy of Chinese milk vetch (CMV; *Astragalus sinicus*) seeds.

Materials and Methods

○ Seeds samples: Harvested in June, 2005 at Im-jin-gak, and stored at 25℃ for 40days.

○ Seed treatment : Wet- or dry-treatment on 5, 30, 35, and 40℃ for 20, 40, and 60days.

○ Standard germination test : Four replications. Germination condition was 15/20℃ with light for 12h. Seeds were considered as germinated when the radicle exceeded in length. Germination counts were made every other day for 20days.

○ Control test : Untreated seeds were evaluated for germination rate at every 20days after harvest. Germination counts were made at 10days (Germinative energy) and 20days (Final germination rate).

○ Seed scarification treatment : Ungerminated seeds after 20 days of germination tests were scratched on seed-coat with a needle.

Results and Discussion

○ Low temperature (5℃) promoted dormancy in both wet- and dry-treatment. High temperature (30, 35 and 40℃) with wet treatment increased germination rate. This shows mechanism for natural control of seed germination.

○ The optimal seed treatment was 35℃ × wet × 40d.

○ Final germination rate of control seed showed variation in the process of storage period. At 80days after harvest, germination rate and speed were highest and this period is consistent with optimum sowing period of CMV seed. The period, shown low germination speed, is consistent with winter season. This results show the circadian rhythms pattern of dormancy in CMV seed. Physiological change of CMV seed during storage might be the cause of variation on seed germination.

○ Mechanical scarification on seed coat helps breaking dormancy of CMV seeds.

○ Dormancy type of CMV was exogenous dormancy by water-proof hard seed coat.

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Conclusion

Seed germination of CMV was improved by high temperature with moist treatment. The result shows the potential of practical application in farm and seed industry for seed treatment. In addition, this experiment shows the mechanism for environmental controlling and the circadian rhythms of dormancy in CMV seed

Acknowledgement

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Table 1. Mean germination percentages after 20days of germination test (15/20℃, 12h photoperiod) on CMV seed treated at 5, 30, 35, and 40°C for 20, 40, and 60 days.

Treatment temperature	20day treatment		40day treatment		60day treatment	
	Dry treatment	Wet treatment	Dry treatment	Wet treatment	Dry treatment	Wet treatment
5℃	28.0	13.0	18.0	17.0	13.0	8.0
30℃	38.0	37.0	32.0	77.0	23.0	59.0
35℃	50.0	63.0	22.0	88.0	23.0	77.0
40℃	40.0	61.0	34.0	70.0	56.0	76.0
LSD(0.05)	12.0					
Control†	22.7		53.3		32.0	

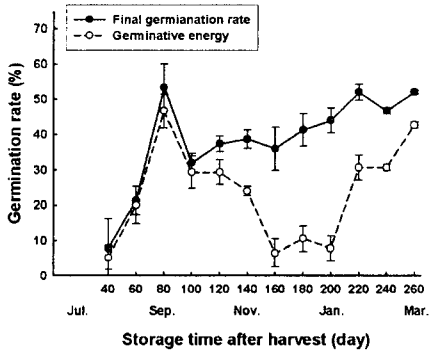

Fig 1. The changes of germinative energy, counted at 10days, and final germination rate, counted at 20days after imbibition, on untreated CMV seeds with various storage period after harvest.

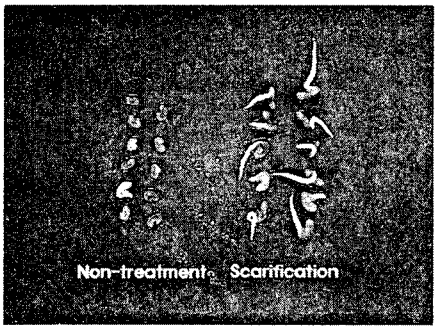

Fig. 2. Effect of scarification on dormant CMV seeds at 2days after imbibition.