Seed Stratification Treatments for Two Hardy Cherry Species

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*Seed of Mongolian cherry (*Prunus fruticosa *Pallas) germinated best after 30 days of warm plus 90 days of cold stratification. Amur chokecherry (*Prunus maackii *Rupr.) was best after 30 days of warm plus 60 days of cold stratification. Longer stratification periods resulted in germination during storage.* Tree Planters' Notes 37(3):3538; 1986.

The genus *Prunus* contains many native and introduced species that are hardy in the Northern Plains and are used for shelterbelt, wildlife, reclamation, and ornamental plantings. Two relatively recent introductions from Asia are Mongolian cherry (*Prunus fruticosa* Pallas) and Amur chokecherry (*Prunus maackii* Rupr.).

Prunus fruticosa is placed in the subgenus Cerasus. It ranges from central and eastern Europe to Siberia and is rated as zone III in hardiness (3). It is a suckering, spreading shrub that grows to 2 meters in height and will form dense thickets. The leaves are a dark glossy green. The tart, dark red fruits measure about 1 centimeter in diameter and are utilized by wildlife and humans. Mongolian cherry may be used in outside row plantings in shelterbelts, recreational plantings, and wildlife plantings.

The seed-propagated selection 'Scarlet' Mongolian cherry (figs. 1 and 2) has recently been released by the USDA Soil Conservation Service for conservation purposes in the Northern Plains (4).

Prunus maackii is placed in the subgenus Padus. It ranges from Manchuria to Korea and is rated as zone II in hardiness (3). It is a nonsuckering tree that grows to 15 meters in height. Its leaves are dull green. The dark purple fruits are borne in racemes and are utilized by wildlife. Amur chokecherry is often planted as an ornamental because of its copper-colored, flaking bark, but it could also be useful in wildlife and recreational plantings.

Information regarding seed propagation of these two species is limited. Initial late fall nursery seedings resulted in minimal germination the following spring but in satisfactory germination the second spring after planting.

Seed of *Prunus* species require a period of after-ripening to aid in overcoming embryo dormancy (2). Several species require a warm stratification period followed by cold stratification. It was believed that *P. fruticosa* and *P. maackii* might benefit from this. Researchers at the Morden Manitoba Experimental Farm found that germination of *P. fruticosa* seed may be affected by the time of fruit

Figure 1—*Growth form of 'Scarlet' Mongolian cherry (courtesy of USDA Soil Conservation Service Plant Materials Center, Bismark, ND).*

collection. Delayed harvesting of fruit improved germination and later ripening varieties had higher germination rates. This was attributed to incomplete embryo development within the seed (1). A warm stratification period should allow embryo development to take place.

We evaluated stratification treatments for overcoming dormancy in the seed of *P. fruticosa* and *P. maackii.*

Figure 2—*Foliage and fruit of 'Scarlet' Mongolian cherry (courtesy of USDA Soil Conservation Service Plant Materials Center, Bismark, ND).*

Materials and Methods

Fruit of *P. fruticosa* and *P. maackii* were collected when fully ripe in the summer of 1983. Pulp was removed by wet maceration and the seed were dried and then stored at 4 °C until removed for this study in January 1985.

Seeds of each species were then counted into lots of 100 for use in the stratification treatments. In a cutting test, 100 percent of *P. fruticosa* and 98 percent of *P. maackii* seed were sound.

Seed were stratified in damp peat moss in polyethylene bags for time lengths varying from 0 days warm + 60 days cold to 60 days warm + 120 days cold. Storage temperatures were 18 ± 2 °C for warm stratification and 4 °C for cold stratification. A total of 10 treatments plus a control treatment of 0 days warm + 0 days cold stratification were tested. Treatments of *P. fruticosa* were replicated three times; those of *P. maackii* twice.

At the end of each stratification period, seed were removed from storage and allowed to germinate at room temperature. Temperatures ranged from approximately 20 to 30 °C. Germination counts were made weekly and a total of 30 days was allowed for germination to take place.

Results

Prunus fruticosa and *P. maackii* seed responded with increased germination to combination treatments of warm and cold stratification as opposed to cold stratification only.

At 0 + 90 days stratification, 33 percent of *P. fruticosa* seed (table 1) germinated; at 0 + 150 days, 46 percent. With an addition of a 30-day warm treatment, the germination rate increased to 67.3 percent with 30 + 90 days. Longer cold stratification treatments resulted in germination and root elongation in storage, which would make mechanical seeding difficult. Substitution of a 60-day warm treatment for the 30-day warm treatment did not increase germination percentage and resulted in in-

Table 1—*Germination of* Prunus fruticosa *following stratification treatments and 30-day germination period*

Treatment	Germination per 100-seed lot	Total germinants in 3 lots	Percent germination
Control			
0+0	0	1	0.003
	0		
	1		
0+60	11	31	10.3
	8		
	12		
0+90	26	99	33.0
	31		
	42		
0+120	36	107	35.6
	35	Germination in storage	
	36		
0+150	39	138	46.0
	46	Excessive germination and root elongation in storage	
	53		
30+60	41	107	35.6
	29		
	37		
30+90	62	202	67.3
	74	Beginning radicle emergence; check at 75 days cold for germination	
	66		
30+120	68	207	69.0
	70	Excessive germination and root elongation in storage	
	69		
60+60	56	181	60.3
	64	Germination in storage	
	61		
60+90	66	201	67.0
	68	Excessive germination and root elongation in storage	
	67		
60+120	63	195	65.0
	69	Excessive germination and root elongation in storage	
	63		

creased germination in storage.

Seed of *P. maackii* (table 2) showed a positive response to warm stratification followed by cold stratification. Germination rate after cold stratification ranged from 0 to 4 percent but increased to a high of 64 percent with a treatment of 30 + 60 days. As with *P. fruticosa*, the use of longer cold stratification or of longer warm stratification periods resulted in increased germination in storage.

Both species contained cracked endocarps on many of the seeds after the warm stratification periods. Germination, however, did not occur without the cold treatment.

Discussion

These results indicate that 30 days of warm stratification followed by 90 days of cold will increase germination of *P. fruticosa* when stratified seed are required for spring nursery planting. It is recommended that checks on the seed in storage begin at 75 days of cold to insure that excessive root elongation does not take place. If germination does begin, the storage temperature can be lowered to just above 0 °C to slow root elongation.

Prunus maackii requires a 30 day warm stratification period preceding the 60-day cold stratification for germination to occur. Cold

Table 2—*Germination of* Prunus maackii *following stratification treatments and 30-day germination period*

Treatment	Germination per 100-seed lot	Total germinants in 2 lots	Percent germination
Control			
0+0	1 1 2 0	1	0.005
0+60	1 3 2 5	8	4.0
0+90	1 1 2 2	3	1.5
0+120	1 0 2 0	0	0.0
0+150	1 2 2 1	3	1.5
30+60	1 60 2 68	128 Radicle emergence & some root elongation	64.0
30+90	1 61 2 53	114 Germinating in storage	57.0
30+120	1 54 2 52	106 Excessive germination & root elongation in storage	53.0
60+60	1 51 2 56	107 Germinating in storage	53.5
60+90	1 46 2 56	102 Germinating in storage	51.0
60+120	1 57 2 52	109 Excessive germination & root elongation in storage	54.5

stratification only resulted in unacceptable germination percentages.

A practical nursery approach would be early fall seeding of *P. fruticosa* and *P. maackii* when at least 30 days still expected. Beds should be mulched and kept evenly moist until winter freeze up occurs. Germination will then take place the following spring.

Literature Cited

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