

PLANT MATERIALS TECHNICAL NOTE

Russian Olive *Elaeagnus angustifolia* L. Seed Longevity

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Figure 1. Russian olive fruit

Introduction

Restoration strategies after Russian olive *Elaeagnus angustifolia* L. removal depend in part on the composition of the seed bank in the soil, including seeds of Russian olive. There is little information in the literature regarding the longevity of Russian olive seeds, with limited available information suggesting germination deteriorates after approximately three years (Olson and Barbour, 2002; Young and Young, 1992). In another study however, Russian olive germination was 14% after five years in dry storage, but the authors did not describe the exact conditions of dry storage, nor was it mentioned if the seeds were given a dormancy breaking moist-chilling prior to germination testing (Comes et al., 1978). Since many woody plants with hard seed coats and relatively large embryos have substantially greater seed longevity than three years, it seemed possible Russian olive seeds may remain viable for more than three years as well. The results of this trial indicate Russian olive seeds can maintain relatively high viability (77%) even after 28 years in dry storage under ambient conditions. Based on these findings, it seems very likely Russian olive seeds have the capacity to remain viable for substantially more than three years, even under field conditions.

Objective

To review germination data and test several samples of Russian olive seeds older than three years-of-age to determine if seed remains viable for more than three years.

Materials and Methods

Older lots of Russian olive and silverberry (*Elaeagnus commutata*) seeds from the Montana, Idaho, and Colorado Plant Materials Centers (PMC), and the Montana Conservation Seedling Nursery were sent to the Montana State Seed Laboratory in 2011 and 2012 for viability testing. Additionally, Russian olive seed viability testing records were sent to Bridger from the Los Lunas, New Mexico, PMC and are included in Table 1. No information on the viability of these seed lots at the time of collection was available. Two hundred seed samples of each lot were sent on to the Montana State Seed Testing Laboratory in Bozeman, Montana, in 2012 for tetrazolium viability testing (Table 1). Viability testing indicates if the seed is alive, but is not synonymous with germination and seedling emergence. Tetrazolium testing is often used in lieu of germination tests for species such as Russian olive, known to have dormancy mechanisms preventing germination until after treatment.

Results

Table 1. Seed viability testing of *Elaeagnus* species (*E. angustifolia* unless otherwise noted).

Source	Accession Number	Lot I.D.	Year Harvested	Storage	Seed Age years	Tetrazolium Viability %	Test Date
Bridger PMC via Los Lunas PMC	434029	SCO-88-NMPMC1	1988	1	6	88	3/25/1994
DNRC, Montana Conservation Seedling Nursery	NA	Lot330-North Dakota-2003	2003	2	9	99	5/18/2012
DNRC, Montana Conservation Seedling Nursery	NA	Lot 299A-NWB-2003	2003	2	9	97	5/15/2012
New Mexico PMC	NA	SFD-78-OC	1978	3	12	65	1994
New Mexico PMC	NA	SFD-79-OC	1979	3	12	35	1991
Montana PMC <i>E. commutata</i>	9081339	SWC-97-FO	1997	1	15	50	8/29/2012
UCEPC	9030901	10/25/1984	1984	4	28	56	5/15/2012
Montana PMC	9005865	SCO-84-LBOX15	1984	1	28	77	9/11/2012
Idaho PMC	T7900/75069C	Gooseberry-1975 SWC-75-Gooseberry Gooseberry Creek, Sanpete County, Utah	1975	5	37	0	5/18/2012

1. Seed stored in a storage facility averaging 55° to 60° F year round, approximate relative humidity measuring 20% to 30%.
2. Seed dried to 5% to 8% moisture content then stored at 15° to 25° F.
3. Seed stored in a storage facility averaging 40° to 45° F year round, approximate relative humidity measuring 40% to 50%.
4. Seed stored under room conditions averaging approximately 60° to 65° F year round, approximate relative humidity measuring 15% to 16%.
5. Seed stored in a storage facility averaging 55° to 60° F year round, approximate relative humidity measuring 20% to 30%.

Discussion/Conclusions

Although stored under variable environmental conditions, testing of these Russian olive and silverberry seed lots suggests viability of this Genus may be retained for much longer than reported. Despite the fact that it is likely viability will deteriorate more quickly under *in situ* conditions, the ability of Russian olive seeds to persist for many years in the seed bank appears

likely. More comprehensive testing of Russian olive seeds of a variety of ages would clarify seed longevity questions regarding this species. As land managers develop re-vegetation plans, they are advised to consider the potential for Russian olive seeds to remain viable in the soil for many years. Vectors of seeds over time by wildlife, water, humans, and other methods should also be considered.

References and Additional Information

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