Seed Development of Perennial Pepperweed Plants Growing in Flood Meadows

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Introduction

Knowledge of seed characteristics is important for developing control strategies for weeds. A species of recent interest is perennial pepperweed (*Lepidim latifolium)*, which has the ability to dominate some of the most productive ecosystems of the West, such as wetlands and riparian zones. It also is an increasing problem in hay meadows of this region. There is concern that hay from pepperweed-infested fields may contain viable seed that could be spread to noninfested areas. The species is difficult to control because of a persistent rootstock that is resistant to many herbicides and is able to readily sprout after mechanical top removal and tillage of infested soils. Pepperweed has been reported to be slow to spread, although dissemination can be rapid and widespread in flood events.

This study was designed to evaluate the germination of perennial pepperweed seed collected on various dates to determine the likelihood that the plant will be spread in hay from infested fields.

Experimental Protocol

Pepperweed seed was collected at four sites, each within 2 miles of the Eastern Oregon Agricultural Research Center (EOARC) in Burns, Oregon, during the 1997 and 1998 growing seasons. All sites were flood meadow communities that contained perennial pepperweed and were not cut for hay. Seed was collected weekly from mid-July to mid-September of 1997 and 1998. Seed was left in the stalk until the spring of 1999 in order to simulate storage conditions of harvested hay.

Seeds collected at the four sites during the growing season were germinated under optimum conditions (alternating 8 hours light at 86°F and 16 hours dark at 68°F) determined by initial germination trials (EOARC file). The germination trial presented here was run for 17 days to allow for complete germination of all viable seed.

Results and Discussion

Assessment of the different collection dates and locations revealed lowest germination for the earliest collection dates and the highest germination at the later dates (Tables 1 and 2). There was a large increase in germination rate during late July and early August.

The initial work required to establish the germination requirements of this species resulted in some interesting observations. For example, seed that was soaked in water overnight produced a very thick gelatinous coat that allowed the seed to float. The expanded seed coat also elevated the seed off the container surface. These seed characteristics illustrate how the dissemination of perennial pepperweed seed may be accomplished during flood events. The results also demonstrated that late cutting (August and September) creates a risk of baling hay that contains viable perennial pepperweed seed.

The spring of 1998 was cooler and wetter than 1997. Therefore, seed development may have been slowed or suppressed and may account for lower germination percentages for seed collected during the 1998 growing season, especially seed collected on July 28 and August 5. There also appeared to be a higher proportion of seeds collected in 1998 that were infected with a fungus. The fungus may have contributed to lower germination levels in 1998, especially from sites 2 and 3 during the last sampling.

Management Implications

Flood meadows that are infested with perennial pepperweed and cut for hay should be cut as early as possible. If hay from infested fields is cut after late July, movement of the hay should be carefully monitored to avoid contamination of clean fields.

Table 1. Germination after 17 days of perennial pepperweed seed collected at various dates in 1997. Means followed by different letters are statistically different.

	Collection date					
	7/15	7/21	7/30	8/7	8/15	8/27–28
Site no.	Germination %					
1	5	15	16	55	81	98
2	25	12	11	42	82	96
3	6	16	30	72	94	98
4	13	14	42	74	83	98
Average	12[d]	14[d]	25[c]	61[b]	85[a]	98[a]

Table 2. Germination after 17 days of perennial pepperweed seed collected at various dates in 1998. Means followed by different letters are statistically different.

	Collection date				
	7/20	7/28	8/5	8/25	9/16
Site no.	Germination %				
1	8	1	54	95	93
2	0	20	21	77	56
3	19	2	66	88	26
4	0	5	34	93	95
Average	7[c]	7[c]	44[b]	89[a]	68[a]