SEEDBED CONTENTS ON AN ELECTRIC TRANSMISSION RIGHT-OF-WAY

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If large quantities of viable seed are stored in the soil, efforts to eliminate unwanted vegetation on a power line right-of-way through brush cutting or herbicidal application may be thwarted. Consequently, a study was designed to obtain information on the nature and magnitude of the soil seedbank for the treatments being evaluated on the Shawville-Lewistown 230 KV line on State Game Land 33.

METHODS

Three replications of each of the following six treatment areas were selected for study on the basis of uniformity of site conditions:

Treatment a. Handcutting only;

Treatment b. Selective dormant basal spray of Banvel 520;

Treatment c. Selective summer basal spray of Gardon 4, and Cidekick;

Treatment d. Selective summer basal spray of Weedone 2,4-DP, Amdon 101, and Surfel;

Treatment e. Pellet application of Tordon 10K or Amdon 10K; and

Treatment f. Selective frill and squirt application of Tordon RTU.

Three replications of the adjacent nontreated forest were also included in the study.

On each treatment-replication area, a line was established across the right-of-way, and eight sample points were systematically located along it. At three locations, the line was extended into the forest, and four additional sample points were systematically located along it.

At each sampling point, cover was estimated by species or species group on 2.32-ft by 2.32-ft square plots by the Braun-Blanquet system (+ - rare; 1 - common but low in cover value; 2 - 5-25% cover; 3 - 25-50% cover; 4 - 50-75% cover, and 5 - 75-100% cover). Soil samples, one of the duff and the other of the A horizon were collected from 7-inch diameter plots.

Soil samples were sieved and placed in trays on top of a 1-inch layer of sterilized sand. The trays were randomly arranged in a greenhouse and watered periodically. Germinated seedlings were identified, counted, and recorded also periodically.

RESULTS

The important findings were:

1. Large Variation in Seedbank Content in Treated Areas. All of the treated areas had large numbers of emerged seedlings from samples of both the duff and the A soil horizon. The overall mean number of emerged seedlings was 595/ft^2. However, there was considerable variation both among and within treatments. The seedbank content varied from a mean of 382/ft^2 for treatment b (selective dormant basal spray) to 927/ft^2 for treatment c (selective summer basal spray). Because of the large variation among plots within treatments, definite conclusions cannot be made concerning the significance of the differences in emerged seedlings among treatments.

2. Emerged Seedlings of Tree Species Extremely Rare. Of the 24,069 seedlings that emerged from the soil samples taken from the treated areas, only 1 was of a target species—red maple. However, this is equivalent to 1,132 tree seeds per acre. Woody shrubs were also rare—only 65, all from small-shrub species, notably blueberry. Sixty percent of the total number of emerged seedlings were grasses. Goldenrod, blackberry, and hayscented fern seedlings also were common.

3. Present Cover Not a Good Indicator of Seedbank Composition. Species composition of emerged seedlings from the seedbank often differed greatly from the vegetation presently occupying the site. Some of the highest numbers of emerged grass seedlings came from plots which had no grass cover at all. However, for goldenrod, blackberry, and hayscented fern, there was a trend of increasing numbers of emerged seedlings with increasing cover values for these species.

4. Lower Seedbank Content but More Tree Species in Adjoining Forests. The mean number of emerged seedlings from plots taken in the forest was 224/ft^2, only 38 percent of that of the treated right-of-way areas. Grasses were still the most common species group, but there were significant numbers of seedlings of woody shrub species (10 percent of the total), again mostly blueberry. Although there were only 5 tree seedlings (2 red maple, 2 sassafras, and 1 aspen) out of a total of 717 emerged seedlings, those 5 are equivalent to almost 68,000/acre. The low number of emerged tree seedlings may be a result of depletion of the seedbank following gypsy moth-caused mortality of trees a few years previously.

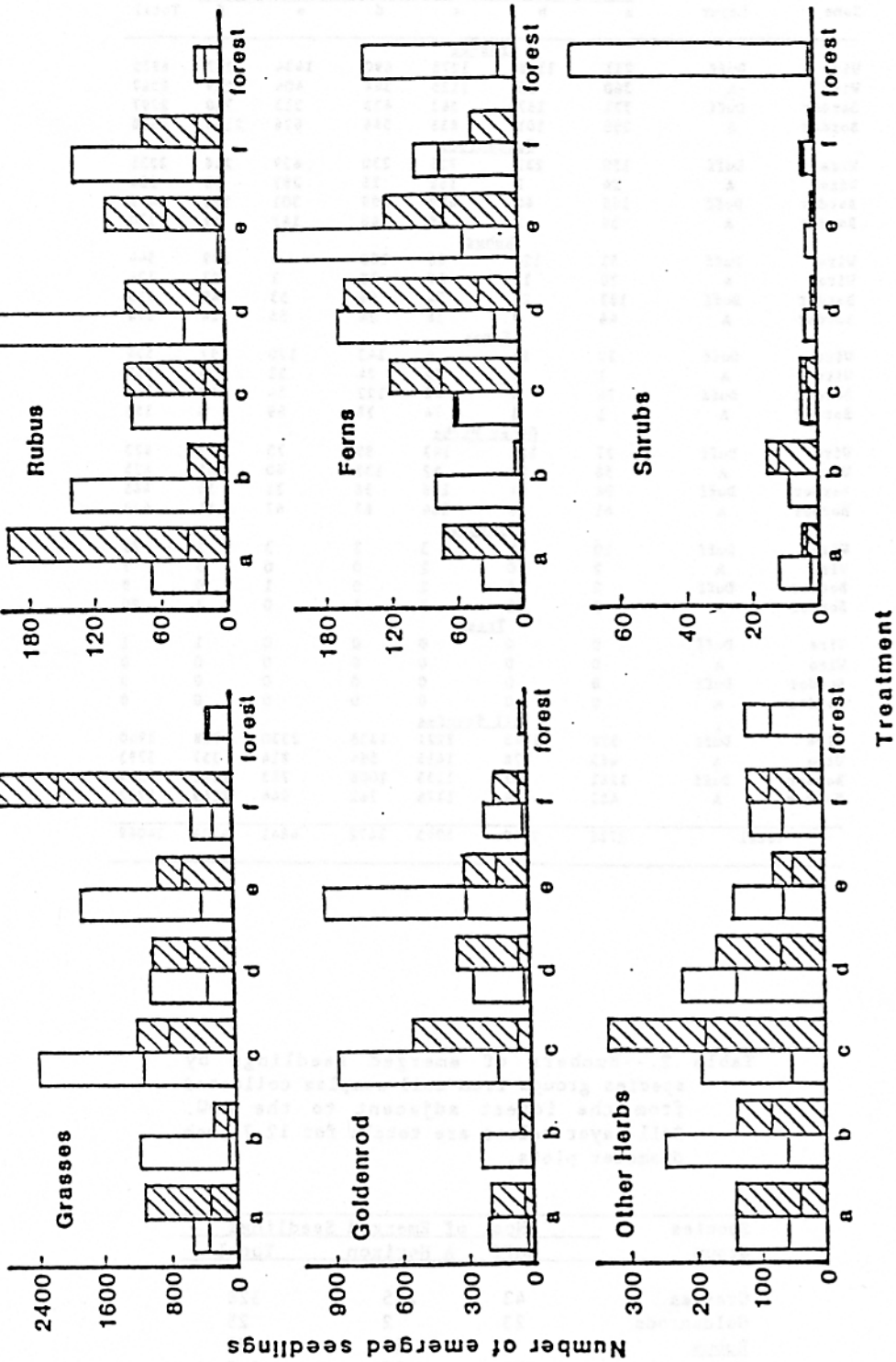

Fig. 1. Numbers of emerged seedlings by species groups from soil samples taken in variously treated portions of a right-of-way. Values are totals for 12 7-in diameter plots. (Open bar--wire zone; cross-hatched bar--border zone; horizontal line separates duff content (above line) and A-horizon content (below line); where no horizontal line is present, there is little or no A-horizon content.)

Table 1.--Numbers of emerged seedlings by species groups from soil samples taken in variously treated portions of a ROW. Treatment area values are totals for 12 7-inch diameter plots.

ROW Zone	Soil Layer	Treatment a	b	c	d	e	f	Total
				Grasses				
Wire	Duff	211	1108	1278	690	1434	257	4978
Wire	A	360	95	1125	344	404	239	2567
Border	Duff	771	167	363	423	313	760	2797
Border	A	355	101	838	586	626	2104	4610
				Goldenrods				
Wire	Duff	190	231	725	230	639	216	2231
Wire	A	24	7	158	25	297	23	534
Border	Duff	165	60	499	299	301	155	1479
Border	A	36	3	59	46	147	39	330
				Rubus				
Wire	Duff	51	124	68	183	9	109	544
Wire	A	20	18	19	39	1	27	124
Border	Duff	155	26	74	66	53	49	423
Border	A	46	9	18	24	55	24	176
				Ferns				
Wire	Duff	39	81	4	143	170	97	534
Wire	A	1	0	59	24	52	0	136
Border	Duff	74	4	46	122	54	43	343
Border	A	1	1	74	38	69	0	183
				Other Herbs				
Wire	Duff	77	192	143	89	75	47	623
Wire	A	58	58	52	132	60	65	425
Border	Duff	94	81	149	98	31	35	488
Border	A	41	58	184	67	47	81	478
				Shrubs				
Wire	Duff	10	9	3	3	3	1	29
Wire	A	2	0	2	0	0	3	7
Border	Duff	2	4	2	0	1	0	9
Border	A	3	12	3	1	0	1	20
				Trees				
Wire	Duff	0	0	0	0	0	1	1
Wire	A	0	0	0	0	0	0	0
Border	Duff	0	0	0	0	0	0	0
Border	A	0	0	0	0	0	0	0
				All Species				
Wire	Duff	578	1745	2221	1338	2330	728	8940
Wire	A	465	178	1415	564	814	357	3793
Border	Duff	1261	342	1133	1008	753	1042	5539
Border	A	482	184	1176	762	944	2249	5797
Total		2786	2449	5945	3672	4841	4376	24069

Table 2.--Numbers of emerged seedlings by species groups from soil samples collected from the forest adjacent to the ROW. Soil-layer values are totals for 12 7-inch diameter plots.

Species Group	Nos. of Emerged Seedlings Duff	A Horizon	Total
Grasses	43	285	328
Goldenrods	23	2	25
Rubus	9	14	23
Ferns	124	16	140
Other Herbs	43	78	121
Shrubs	74	1	75
Trees	4	1	5
All Species	320	397	717