

Variability among leafy spurge ecotypes

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Root cuttings of leafy spurge were obtained from Colorado, Idaho, South Dakota, Alberta, Saskatchewan, North Dakota and Montana. The root cuttings were grown in the greenhouse and 18 months later transplanted in the field in Bozeman, MT. The ecotypes were arranged in a randomized complete block design with four replications.

Growth and vigor of the 12 ecotypes were compared 15 months after transplanting by counting the number of shoots and distance from parent plants. The number and length of lateral roots was measured. The lateral root buds were counted. Length and width of leaves located on-third the distance from the base of mature plants were measured.

Tolerance of the strains to herbicide and tillage treatments was determined. Picloram, 2,4-D and a combination of picloram and 2,4-D was applied in July, 1966. The ecotypes had been established in the field for two years. Cultivated plots were tilled with a duck-foot cultivator on July 22, August 15 and September 12, 1966. The number of shoots were counted in a 3-foot diameter circle placed in the center of each plot in June 1967.

Table 1. Shoot and root growth of 12 strains of leafy spurge 15 months after transplanting in the field at Bozeman, MT.

Leafy spurge strains	Shoots per plant	Maximum shoot distance from mother plant (cm)	Lateral root length (cm)	Number of lateral roots	Lateral root buds
Canada 1	1	69	112	15	97
Canada 2	14	109	147	19	124
Colorado	3	53	66	4	18
Wyoming	14	97	109	4	87
Idaho	2	84	114	18	68
S. Dakota	5	89	94	18	50
N. Dakota 1	10	94	102	28	93
N. Dakota 2	8	107	117	12	61
Missoula, MT	2	66	104	15	105
Mocassin, MT	12	99	130	16	192
Bozeman, MT	4	69	130	11	70
Antelope, MT	3	64	76	4	22
LSD (.05)	5	22	33	8	29

Table 2. The length and width of leaves of 12 strains of leafy spurge.

Strain	Leaf length (mm)	Length width (mm)
Canada 1	68.3	5.8
Canada 2	89.0	8.3
Colorado	64.0	6.3
Wyoming	51.8	7.3
Idaho	49.3	7.5
S. Dakota	66.5	9.8
N. Dakota 1	52.5	9.5
N. Dakota 2	69.5	5.3
Missoula, MT	68.8	8.3
Moccasin, MT	91.0	7.3
Bozeman, MT	87.5	12.3
Antelope, MT	64.0	8.3
LSD (.05)	8.6	1.9

Table 3. Number of leafy spurge shoots per plant on June 26, 1967, 11 months after tillage or herbicide application.

Strain	Number of shoots per plant			
	Picloram	Picloram + 2,4-D	2,4-D	Tillage
Canada 1	.3	.0	38.0	23.3
Canada 2	1.3	2.3	101.8	92.8
Colorado	5.0	2.0	55.8	33.0
Wyoming	.0	2.3	--	--
Idaho	1.0	4.0	51.3	69.8
S. Dakota	9.3	9.3	104.0	80.8
N. Dakota 1	15.8	29.0	112.0	115.8
N. Dakota 2	2.3	3.3	88.3	91.3
Missoula, MT	3.8	1.3	88.5	10.3
Moccasin, MT	.3	.3	89.8	139.8
Bozeman, MT	.5	.3	91.3	33.0
Antelope, MT	.0	.5	15.8	17.3
LSD (.05)	7.6	6.4	40.7	46.4

There was considerable variation in plant growth and vigor among the 12 ecotypes. The number of shoots ranged from 1 in the Canada I ecotype to 14 in the Wyoming ecotype (Table 1). The maximum distance of the shoots from the parent plant varied between 53 to 109 cm. Differences were also evident in the lateral root length and the number of lateral roots and lateral root buds. Leaf length and width varied significantly between strains (Table 2). Leaf length varied from 49 to 91 cm. Width ranged from 5 to 12 cm.

The North Dakota 1 ecotype was the most tolerant to the three herbicide treatments (Table 3). The ecotype collected in Antelope, MT was the most susceptible to herbicide treatments. The North Dakota 1 ecotype was most tolerant to tillage, and the ecotype from Antelope, MT was least tolerant to tillage.

In conclusion, there are significant variations in plant morphology and herbicide tolerance among the ecotypes tested.