

알팔파에 대한 잡초의 추출물과 잔기의 타감작용

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ALLELOPATHIC ACTIVITY OF SOME WEED SPECIES EXTRACTS AND RESIDUES ON ALFALFA

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Objectives:

To evaluate the variation among weeds species and relative inhibitory effects of seven different weed species top growth and root extracts, assess the toxicity of various concentrations of velvetleaf top extracts, compare whether or not top growth and root extracts of dried and fresh material inhibit germination and seedling growth of alfalfa was conducted.

Materials and Methods:

Dried tops and root extracts of seven different weed species, canathis thistle, crabgrass, giant foxtail, pigweed, velvetleaf, prostrate knotweed fresh top and root extracts, and various concentration of extract (0, 5, 10, 15%, w/v) residue rate (0.0, 0.25, 0.5, 0.75, 1.0%) of velvetleaf. Experimental design was CRD.

Results and Discussion:

Top growth extracts of weeds exhibited greater allelopathic effects than root extracts. Velvetleaf extracts were the most inhibitory, while large crabgrass extracts had the least allelopathic effect on alfalfa. Germination, seedling length and weight of alfalfa were inversely proportional to the concentration of dried velvetleaf extracts. These results demonstrate the allelopathic activity of different weed species extracts and suggest that weeds may affect crop growth and development due to the inhibitory effects of allelochemicals present in weed tissue.

Table 4.2. Allelopathic effects of dry top growth extracts from various weeds on alfalfa germination, seedling growth and weight, seedling vigor, and rate of germination.

Weed Species	GP ¹	RL ¹	HL ¹	CW ¹	RW ¹	HW ¹	SV ¹	RG ¹
	%	cm		mg				
Canada Thistle	74.0	2.3	2.9	1.08	0.33	0.53	170.20	46.38
Crabgrass	78.3	2.5	3.1	1.15	0.33	0.70	195.20	32.63
Giant Foxtail	63.8	1.8	2.6	0.85	0.23	0.48	96.5	22.17
Lambsquarter	53.8	1.8	2.6	0.93	0.23	0.50	96.72	28.23
Pigweed	71.5	2.1	2.8	1.03	0.30	0.53	150.15	36.81
Velvetleaf	52.0	1.7	2.4	0.75	0.15	0.43	95.87	22.80
P. Knotweed*	69.5	1.9	2.7	0.93	0.23	0.53	134.07	34.98
Control	89.0	3.8	3.4	1.50	0.50	0.80	335.95	61.38
LSD(0.05)	10.15	0.10	0.12	0.07	0.07	0.06	21.79	4.80
CV(%)	10.26	3.19	2.87	4.88	15.64	7.07	9.37	9.07

* Prostrate Knotweed.

¹ GP, Germination Percentage; RL, Radicle Length; HL, Hypocotyl Length; CW, Cotyledons Weight; RW, Radicle Weight; HW, Hypocotyl Weight; SV, Seedling Vigor; RG, Rate of Germination.

Table 3. Total germination of alfalfa as a function of increasing extract concentration (0, 5, 10, 15%) using seven weed species extracts.

Weed Species	Regression Equation Y=a+bx	R ²
Canada Thistle	Y=88.68-2.59x	0.82
Crabgrass	Y=89.93-2.39x	0.88
Giant Foxtail	Y=81.35-3.50x	0.82
Lambsquarter	Y=83.28-3.40x	0.76
Pigweed	Y=89.50-3.43x	0.95
Velvetleaf	Y=81.08-3.69x	0.87
P. Knotweed*	Y=87.68-3.42x	0.90

* Prostrate Knotweed.

Table 5. Emergence and survival percentage of alfalfa seedling by the different velvetleaf residue treatment.

Residue (w/w, %)	Emergence (10 DAP)	Survival (20 DAP)
0.0	67.0a	85.5a
0.25	61.5b	77.9ab
0.5	49.3cd	72.0b
0.75	51.3c	67.7bc
1.0	44.0d	56.7c

