The practical implications of these findings are obvious, since high concentrations of K^+ might contribute to decrease the effects of antihistaminics; on the other hand, a combination of Mg^{++} and Ca^{++} might contribute to strengthen the effect of these important therapeutic agents.

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Stubble Mulch Studies: Effect of Sweetclover Extract on Corn Germination

T. M. MCCALLA and F. L. DULEY

Soil Conservation Service,
U. S. Department of Agriculture, and
Nebraska Agricultural Experiment Station, Lincoln

Numerous studies have shown the varied influence of plant and microbial extracts and decomposition products on the growth of plants and microorganisms (*1–5*). In the rapidly expanding system of stubble mulch farming, plant materials are being used for mulching the soil to protect it against excessive runoff and erosion by wind and water. Under certain conditions, some mulching materials have been observed to reduce the stand and growth of corn. In the field, sweetclover has not been observed to influence stands of corn adversely. In fact, corn following sweetclover has been much more productive than that on land without legumes. This improved or stimulated growth usually has been attributed to the increased amount of available nitrogen released upon the decomposition of sweetclover residues.

The effect on germination of water extracts of several different plant materials including sweetclover was tested. Sweetclover hay that had been cut when the plants were about 18″–24″ high was used in the tests herein reported. Portions of the hay were cut into short lengths and placed in flasks with varying proportions of water. The corn seeds were then placed in the flasks and soaked in the sweetclover-water mixture for 24 hrs. At the end of the soaking period 5 seeds from each concentration of sweetclover extract were placed on an agar medium[1] in Petri dishes in quadruplicate. The plates were incubated at room temperature. After 3 days the root and top growth of the corn seedlings were measured and compared with those of seeds soaked in distilled water. The sweetclover had a more depressing effect on germination and seedling growth than did alfalfa, wheat straw, or oat straw. At times wheat straw in the laboratory has given no effect, and in other tests a stimulation of growth. The results with sweetclover are shown in Table 1. Even at a dilution of 1 part of sweetclover to 100 parts of water the growth of the corn seedlings was reduced.

[1] The medium (Crone's) contained all essential mineral nutrients except nitrogen, and 1.5% agar.

TABLE 1

INFLUENCE ON GERMINATION AND GROWTH OF SOAKING CORN SEEDS FOR 24 HRS WITH SWEETCLOVER EXTRACT

	Parts of plant material to distilled water	Germination (%)	Seedling growth after 3 days (length in cm)*	
			Tops	Roots
Sweetclover	1– 5	33	0.3	0.8
"	1– 10	52	0.5	0.9
"	1– 20	75	0.7	1.7
"	1– 80	92	1.8	3.8
"	1–100	87	1.6	4.0
Control		95	2.8	6.4

* Based on the number of germinated seeds.

The results with corn seeds soaked in different concentrations of coumarin in distilled water are shown in Table 2. It appears from these results that the coumarin in sweetclover may be one of the constituents of sweetclover that inhibited germination and growth of the corn seedlings.

TABLE 2

THE INFLUENCE ON GERMINATION AND GROWTH OF SOAKING CORN SEEDS IN COUMARIN SOLUTION FOR 24 HRS

Grams of coumarin in 100 ml of water	Germination (%)	Seedling growth after 3 days (length in cm)	
		Tops	Roots
0.125	0	0	0
0.062	0	0	0
0.031	12	0.3	0.4
0.015	42	0.4	0.5
0.007	90	1.2	4.2
None	95	2.9	7.6

From these and other results obtained in similar tests it appears that many plant residues contain substances which, under certain conditions, retard or inhibit germination and growth of plants in the seedling stage. This fact may have far-reaching implications with respect to the whole question of plant growth. However, the effect of these substances when in the soil and exposed to innumerable microbiological reactions may be entirely different than when in relatively pure cultures.

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