BREAKING DORMANCY OF LEAFY SPURGE BUDS WITH POTASSIUM GIBBERELLATE

By E. A. Helgeson

Leafy spurge (**Euphorbia esula** L.) is a perennial weed infesting many areas in North Dakota. Like so many North Dakota weeds this plant has a deep, wide-spreading root system equipped with numerous dormant buds. When the tops are removed a few of these buds produce new shoots but the majority of the buds remain dormant.

With the advent of the new hormone-type chemical herbicides, a search has been made for a chemical which will move from the tops into the deepest roots, either killing the roots or forcing all dormant buds into active growth.

Until about 2 years ago no chemical tried has proved capable of these results. Recently, a natural plant hormone produced by the fungus **Gibberella fujikuroi** (Saw.) Wr. has shown promise as a means of breaking dormancy in potato buds and as a general growth stimulant (1). In a recent paper, (2) Shafer and Monson obtained some growth stimulation and breaking of dormancy in spurge buds but not in ironweed (**Vernonia baldwini** Torr.). The work reported here in respect to the effects of gibberellic acid on leafy spurge confirms the findings of Shafer and Monson.

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Leafy spurge plants 18 months old growing in Fargo clay soil in 6-inch pots were treated with 2 formulations of Merck's potassium gibberellate (KGA). A dust formulation was placed on the soil surface and allowed to move into the soil under normal watering procedures. In the second type of treatment an emulsifiable concentrate was poured over the dormant crown buds and onto the soil, using 100 ml. of solution per pot. Actual amounts of KGA per pot are given in tables 1 and 2. The liquid treatment was applied Nov. 16, 1957, and final readings were taken Dec. 4, 1957. The dust was applied Dec. 5, and final readings were taken on Feb. 22, 1958. Ten plants were used for each treatment.

Table 1 presents the data on the liquid formulation. It will be noted that a marked stimulation of buds occurred with the 10 ppm solution and that higher concentrations were toxic or ineffective. Growth of shoots was not stimulated. While the data presented in table 2 appear somewhat inconsistent as to the breaking of dormancy, a very real stimulation of shoots was produced so far as growth in length was concerned.

Some of the inconsistency in results may have been caused by variations in watering and consequent leaching of the

active principle into the soil. Also the short duration of the liquid treatment may not have allowed time for stimulated shoot growth to take place.

Flowering appeared to be speeded up and abnormal vegetative shoots were produced on some flowering branches.

Acknowledgement—Chemicals used were furnished by Merck and Co. Progress report on Hatch 9-1.

Literature Cited—(1) Stowe, Bruce B. and Toshio Yamake. The history and physiological action of the gibberellins. Ann. Rev. Plant Physiol. 8: 181-216. 1957. (2) Shafer. Neal E. and Warren G. Monson. The role of gibberellic acid in overcoming bud dormancy in perennial weeds. I. Leafy spurge (**Euphorbia esula** L.) and ironweed (**Veronia Baldwini** Torr.). Weeds 6: 172-178. 1958.

TABLE 1. Merck's Emulsifiable Concentrate.

Conc. Mg./Pot	Buds			Ave. Sprout Length*
	Total	Forced	Percent Forced	
0.0	63	6	9.7	2.7
10.0	101	36	35.6	2.8
50.0	103	2	1.9	2.4
100.0	106	0	0.0	0.0

*Centimeters

TABLE 2. Merck's Gibrel Dust.

Conc. Mg./Pot	Buds			Ave. Sprout Length*
	Total	Forced	Percent Forced	
0.0	81	37	45.6	6.1
7.5	99	44	44.4	9.5
15.0	71	44	61.9	11.3
22.5	95	36	37.8	12.5
30.0	89	54	54.5	12.9

*Centimeters