Sand Shinnery Oak Response to Dicamba Granules and Picloram Pellets[1]

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Highlight

Two lb./acre of picloram pellets were required to reduce sand shinnery oak (*Quercus havardii* Rydb.) stem density one season after application in the Rolling Plains of northwest Texas. Neither picloram pellets nor dicamba granules reduced the density of live sand shinnery oak stems two years after application.

Sand shinnery oak (*Quercus havardii* Rydb.) is susceptible to foliar sprays containing (2,4,5-trichlorophenoxy) acetic acid (2,4,5-T) and 2-(2,4,5-trichlorphenoxy) propionic acid (silvex). However, susceptibility of broadleaved crops adjacent to rangeland and the possibility of drift often restrict use of sprays containing phenoxy acid herbicides. Soil-applied, dry herbicides are much less susceptible to drift from the target area than are sprays. Also, phenological stage of the problem species at application time is usually less critical with soil-applied herbicides. Requisites for effective woody-plant control with soil-applied herbicides include 1) ability of target species to absorb lethal amounts of chemical via the roots and 2) adequate moisture to move active amounts of herbicide into the root zone. Excessive rainfall may be detrimental by leaching highly soluble herbicides past the root zone. Little research has considered the effect of soil-applied herbicides for control of sand shinnery oak. Robison and Fisher (1968) reported that 3-(*p*-chlorphenyl)-1,1-dimethylurea (monuron) was fairly effective when applied as the wettable powder at 3 lb./acre. The same rate of monuron pellets was ineffective.

Materials and Methods

The study site is located in the Rolling Plains of northwest Texas. The vegetation is dominated by sand shinnery oak and little bluestem (*Andropogon scoparius* Michx.). Topography is undulating with lowlands of deep sand grading into sand underlain by shallow clay on the uplands. The area is generally of the Brownfield-Nobscot series typified by near neutral to loamy sands in the surface 2 ft over several feet of sandy clay loam.

In May of 1969 and 1970, 4-amino-3,5,6-trichloropicolinic acid (picloram) pellets and 3,6-dichloro-*o*-anisic acid (dicamba) granules at rates of 0, 0.5, 1, 1.5 or 2 lb./acre were applied with a hand spreader to 50 by 50-ft plots. At the same time, sprays containing 0.5 lb./acre of 2,4,5-T were applied for comparison. The 2,4,5-T was applied as the propylene glycol butyl ether

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Table 1. Sand shinnery oak stem density (thousands/acre) one and two years following application of pelleted picloram and granular dicamba at various rates (lb./acre) in the Rolling Plains of Texas.[1]

Application rate	One year after treatment				Two years after treatment	
	Study 1		Study 2			
	Picloram	Dicamba	Picloram	Dicamba	Picloram	Dicamba
0	56.6a	56.6a	37.7a	37.7ab	56.6a	56.6a
0.5	44.5ab	60.7a	28.3a	51.3a	49.5a	53.8a
1	44.5ab	56.6a	18.9ab	36.4ab	46.5a	57.9a
1.5	40.5ab	48.6ab	13.5ab	37.7ab	46.5a	40.5a
2	32.4b	40.5ab	12.7b	27.0b	38.4a	46.5a

[1] Means for picloram and dicamba in the same study and evaluated at the same time followed by the same letter are not significantly different at the 5% level.

esters in a diesel oil:water emulsion (1:4) at 21 gal/acre with a truck-mounted sprayer. Each treatment was replicated four times in a randomized complete block design in each experiment. Density of live sand shinnery oak stems was recorded from three, evenly-spaced m² areas taken from diagonal lines across each plot in May, 1971.

Results and Discussion

In both studies, 2 lb./acre of pelleted picloram were required to reduce the density of live sand shinnery oak stems a year after application (Table 1). This reduction accounted for about 50% of the original density in the 1969 study and about 30% of the untreated density in the 1970 experiment. Spraying with 0.5 lb./acre of 2,4,5-T reduced the density of live sand shinnery oak stems by 75% after one year and by 67% after two years. Although pelleted picloram tended to decrease the density of live stems, original growth was replaced by new shoots by two seasons after treatment regardless of application rate. There was no difference in rate of resprouting between plots treated with picloram pellets and those treated with conventional sprays. However, typical auxin-like herbicide symptoms were apparent in sand shinnery oak foliage two years after treatment with picloram pellets. Also, epinasty was most prominent in new sand shinnery oak shoots and annual broadleaf plants indicating some picloram, although in sublethal quantities, remained in the root zone two years after application. Effects from residual dicamba were much less apparent than from picloram. Occasionally symptoms of phytotoxicity were evident on herbaceous broadleaf plants where the higher rates of dicamba granules were used.

Sand sagebrush (*Artemisia filifolia* Torr.) was controlled by 2 lb./acre pelleted picloram in both experiments. Small soapweed (*Yucca glauca* Nutt.) was not controlled by either soil-applied herbicide. No grass damage was noted in either experiment.

These data indicate that soil-applied picloram and dicamba have little promise for control of sand shinnery oak. Lack of effectiveness may be due primarily to inherent resistance of the species to soil applications of these herbicides. The difference in rainfall, about 18 inches, between study years had little apparent effect on the performance of either herbicide. However, in view of the reaction of other *Quercus* species to similar treatments, the data probably also reflect dissipation of the chemicals from the portion(s) of the root zone most active in herbicide uptake.

Literature Cited

Robison, E. D. and C. E. Fisher. 1968. Chemical control of sand shinnery oak and related forage production. Texas Agr. Exp. Sta. Prog. Rep. 2583 *in* Brush Research in Texas, 1968. 5–8.