

Use of Allyl Alcohol as a Pre-emergent Weedkiller in Coffee Seedbeds¹

J. E. Barbosa-Cupeles and M. A. Lugo-López²

INTRODUCTION

Weed control in coffee seedbeds is a very expensive farm item. Hand-picking of weeds is the conventional method used throughout the coffee-growing regions. Experiences in the control of weeds in tobacco seedbeds³ led to the investigation reported in this paper. Allyl alcohol is a water-soluble contact weedkiller available in local markets either in its pure chemical form or in other formulations.

This paper reports data from an experiment conducted at the Gurabo Substation in an effort to determine whether allyl alcohol as a pre-emergent weedkiller is effective in coffee seedbeds, whether it adversely affects seed germination and seedling vigor, and which is the optimum concentration of the chemical that should be used.

MATERIALS AND METHODS

The experimental field was located on an alluvial soil at the Gurabo Substation farm in east-central Puerto Rico. The experimental design was a paired-plot one with four treatments, each replicated nine times. The treatments were included in 18 blocks. The plots were 10 feet by 10 feet in size (fig. 1). The treatments consisted of varying rates of application of the weedkiller as follows: 0, 1, 2, and 3 gallons of allyl alcohol per 1,000 square feet of area, respectively.

The allyl alcohol was diluted in 50 gallons of water and spread evenly over the plots on December 10, 1958. Seed of the Bourbon coffee variety were sown 6 days later. A 9-10-5 fertilizer was applied at the rate of 1,000 pounds to the acre. Germination was excellent and all plants survived. Weeds were hand-picked at two periods: January 15 and April 20, 1959 and weight of weeds per plot were recorded. For statistical analysis the weights of the weeds per plot were combined.

¹ Contribution from the Gurabo Substation.

² Research Assistant in Agronomy and Soil Scientist in Charge of the Gurabo Substation, respectively, Agricultural Experiment Station, University of Puerto Rico, Gurabo, P.R. Appreciation is expressed to Dr. H. R. Cibes, Associate Plant Physiologist, for his advice as to the concentrations of allyl alcohol to test, and to Dr. B. G. Capó, Associate Director, and Mr. A. Cruz Miret, Assistant Agronomist, for helping in the design of the experiment and the interpretation of the data.

³ Cibes, H. R., and Amy, A. S., Control of weeds in tobacco seedbeds, *J. Agr. Univ. P.R.* 40(1) 85, 1956.



FIG. 1.—General view of the experimental field where the effectiveness of allyl alcohol, in different concentrations, was tried as a weedkiller in coffee seedbeds.

TABLE 1.—*Weight of weeds from control plots and from those receiving allyl alcohol at various concentrations*

Treatment identification No.	Rate of allyl alcohol applied	Adjusted mean weight of weeds ¹	Outyielded indicated treatment at the—	
			5-percent level ¹	1-percent level ¹
	<i>Gal./1,000 sq.ft.</i>	<i>Lb./1,000 sq.ft.</i>		
1	3	8.69	—	4
2	2	4.18	3	4
3	1	12.10	—	4
4	0	21.63	—	—

¹ Standard deviation of mean = 2.0108 lb; degrees of freedom for error = 15.

RESULTS AND DISCUSSION

Table 1 gives the combined adjusted mean weights of weeds for each treatment. A summary of the analysis of variance of the data obtained is given in table 2. The use of allyl alcohol at rates of 1, 2, and 3 gallons per 1,000 square feet of seedbed reduced weeds markedly. The mean differences between these treatments and the control plots were highly significant.

The use of 2 gallons of allyl alcohol was significantly better than the use of only 1 gallon per 1,000 square feet. There was no reduction in the germi-

TABLE 2.—*Summary of the analysis of variance of the experimental data herein reported*

Source	Degrees of freedom	Sum of squares	Mean square	<i>f</i>
Total	35	2,905.41		
Blocks (unadjusted)	17	1,554.52		
Treatments (adjusted)	3	986.98	328.9933	13.5608 ¹
Error	15	363.91	24.2607	

¹ Indicates highly significant differences between treatments.



FIG. 2.—The use of allyl alcohol as a pre-emergent weedkiller on large scale at the Gurabo Seed Farm was very effective in keeping weeds under control, thus reducing expenses considerably.

nation of the coffee seed and no adverse after-effects were observed on the seedlings.

The reduction in weeds attributable to the use of allyl alcohol results in considerable savings, as weeding must be done by hand in coffee seedbeds, and it is quite an item of expense. Furthermore, more healthy and vigorous

seedlings can be obtained because allyl alcohol-treated seedbeds have so few weeds that there is but little competition for essential nutrients and moisture during the development and growth of the seedlings.

Following these tests allyl alcohol was used on a more extensive scale in coffee seedbeds established as part of the program of the Gurabo Seed Farm and the small-scale experimental results were fully confirmed (fig. 2). Weeding expenses were reduced as compared to previous years where no weedkillers were used in coffee seedbeds.

It might be well to emphasize here that allyl alcohol is poisonous and irritant, and is a lachrymator. Considerable care must be exercised in handling this chemical. Farmworkers should be properly trained and duly protected.

SUMMARY

Data are reported here from a field experiment in which allyl alcohol was used in coffee seedbeds as a pre-emergent weedkiller. Rates of 1, 2, and 3 gallons per 1,000 square feet of seedbed were used in comparison to check plots where no allyl alcohol was applied. The use of allyl alcohol reduced the weeds in all treated plots, the mean differences between them and the control plots being highly significant. Using 2 gallons of allyl alcohol was better than using 1 gallon per 1,000 square feet of surface.

RESUMEN

Se informan aquí datos de un experimento de campo donde se usó el alcohol alílico como yerbicida pre-emergente en semilleros de café. El uso del alcohol alílico, a razón de 1, 2 y 3 galones por cada 1,000 pies cuadrados de semillero, se comparó con las parcelas testigos que no recibieron yerbicida. El uso del alcohol alílico redujo los yerbajos en todas las parcelas tratadas, registrándose diferencias altamente significativas entre éstas y las parcelas testigos. El uso de 2 galones de alcohol alílico por cada 1,000 pies cuadrados de superficie fue significativamente superior al de un galón.