

Research Note

SUCROSE CONTENT AS INFLUENCED BY HOUR OF POLARIS APPLICATION ON FIELD-GROWN SUGARCANE¹

Ripening of sugarcane with chemical compounds such as Polaris² (glyphosine) has become a commercial practice in many sugarcane areas. However, the hour of the day the ripening compound is applied has never been considered as an important factor in its effectiveness. Applications are usually made by aircraft in the early morning to avoid problems of spray drift. Recent work by Alexander³ in Puerto Rico has shown that the hour of the day Polaris is applied can influence its ability to increase sucrose levels in the cane. A greenhouse experiment indicated that application of Polaris at 1630 and 1830 h gave significant increases in Brix and pol when compared to 0630. A small-plot field experiment was used to corroborate the greenhouse findings of the influence of the hour of the day Polaris is applied on the growth and sucrose content in sugarcane.

A portion of a replicated field experiment evaluating candidate chemical ripeners was used for this study⁴. The two treatments, aside from the untreated control, consisted of the application of 3.5 lb/acre of Polaris (85% active ingredients), one at 0700 and the other at 1700 h replicated three times. The crop was a PR 980 first ratoon previously cut on March 2, 1975 and sprayed with Polaris on December 3, 1975. The field, a poorly drained Piñones sandy clay, was located at the Tiburones farm, Central Cambalache, Sugar Corporation of Puerto Rico.

Each plot consisted of five sprayed rows, with a total area of 0.0145 acre. Effects of spray drift between plots was largely eliminated by leaving two guard rows between plots. The spray was applied above the cane canopy through a single wide-angle nozzle mounted on a long lance. The Polaris was applied in aqueous solution at the rate of 50 gal/acre. This volume of spray required two passes. Stalk samples were taken at 0, 2, 4, 6, and 8 weeks after the Polaris application. Three fully-

¹ Manuscript submitted to the Editorial Board September 17, 1976.

² Trade names are used in this publication solely for the purpose of providing specific information. Mention of a trade name does not constitute a guarantee or warranty of equipment or materials by the Agricultural Experiment Station of the University of Puerto Rico or an endorsement over other equipment or materials not mentioned.

³ Alexander, A. G., Efficiency of chemical ripener action in sugarcane. I. Growth and quality responses to Polaris applied at different hours of the day. *J. Agric. Univ. P.R.* 60(4): 460-8, 1976.

⁴ The authors gratefully acknowledge the cooperation of Pedro A. Rodríguez Marrero and his staff, North Research Center, Sugar Corporation of Puerto Rico.

sprayed rows were used for a 20 whole-cane sample per plot. The samples were chopped, frozen, and analyzed for sucrose components by the pol-ratio method. Height measurements were also made before each sampling.

Rainfall was 14.95 inches and temperature averaged 64° F minimum and 84° maximum for the 8-week period of the experiment.

The results of the 0700 and 1700 h treatments are given in table 1. The

TABLE 1.—A comparison of Polaris (3.5 lb/acre) applied at 0700 (AM) and 1700 (PM) hours on sucrose components and growth

Item	Treatment	Interval between application and harvest, weeks				
		2	4	6	8	Average
Sucrose % cane	AM	3.42	3.85	4.58	6.19	4.51
	PM	4.34	4.66	4.90	7.11	5.25
	% increase ¹	26.9	21.0	7.0	15.0	16.4
Sucrose % juice	AM	6.05	6.35	7.09	8.64	7.07
	PM	6.71	6.98	7.33	9.43	7.65
	% increase	10.9	9.9	3.4	9.1	8.2
Brix % cane	AM	10.39	10.51	11.13	12.44	11.12
	PM	10.31	10.53	11.30	12.77	11.23
	% increase	-.8	0	1.5	2.7	.1
Pol % cane	AM	6.11	6.40	7.16	8.79	7.09
	PM	6.75	7.02	7.41	9.59	7.69
	% increase	10.5	9.7	3.5	9.1	8.5
Purity %	AM	58.10	60.62	63.92	70.68	63.33
	PM	64.44	65.41	65.38	73.03	67.07
	% increase	10.9	7.9	2.3	3.3	5.9
Fiber % cane	AM	16.51	15.03	15.61	17.94	16.27
	PM	16.19	15.01	15.65	17.26	16.03
	% increase	-1.9	0	.3	-3.8	-1.5
Growth—cm	AM	9.7	7.7	10.0	13.3	10.2
	PM	10.3	10.3	8.0	4.3	8.2
	% increase	6.2	33.8	-20.0	-67.7	-19.6
Weight of tops, lb	AM	7.5	7.3	5.6	7.4	7.0
	PM	5.5	6.6	8.1	8.2	7.1
	% increase	-26.7	-9.6	44.6	10.8	1.4

¹ Percent increase of the PM over the AM treatment.

1700 h application of Polaris gave positive increases in all sucrose components except Brix and fiber-percent-cane. Percent increases of the 1700 h treatment compared to that at 0700 h were greatest for sucrose-percent-cane, especially at 4 weeks after application.

The growth of the cane increased with the afternoon application as compared to the morning for 2 and 4 weeks after applying Polaris. However, measurements at 6 and 8 weeks after application showed severe growth reduction for the afternoon treatment. The reverse was observed for weight of tops.

On April 8, 1976, a commercial application of 4 lb/acre of Polaris was made by airplane to 8.5 acres at 0700 h and 12.4 acres at 1600 h on part of the same cane field where the experiment was located. Harvest data at 6 weeks after application showed a sucrose-percent-cane value of 6.65 for the 0700 h and 6.97 for the 1600 h application. This represented a 4.8% increase in sucrose in the afternoon-treated cane over that sprayed in the morning. For the replicated field experiment the increase was 7.0% in sucrose content 6 weeks after application. Alexander obtained an increase of 18.2% in Brix and 42.7% in pol at 3 weeks after application on 4-month-old cane grown in the greenhouse.³

Although this is but one replicated field experiment and a commercial unreplicated trial, the results obtained appear to corroborate Alexander's greenhouse experimental results showing that late afternoon applications of Polaris are more effective than those made in early morning. Further work is needed to verify these field results with different varieties under varied field conditions.

George Samuels
Severiano Alers-Alers
Department of Agronomy and Soils