

# The Application of Fertilizers in Relation to the Handling of Sugarcane Trash

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## INTRODUCTION

The proper handling of trash in sugarcane fields is of great importance to Puerto Rican growers because of its direct bearing on the cost of production. Utilization of the trash presents practical difficulties. Many sugarcane planters simply burn it. Samuels *et al.* (3)<sup>2</sup> have shown losses in yields of cane and Bonnet *et al.* (1) have shown soil losses as a result of the practice of burning the trash.

Aside from burning the cane trash, the methods of handling this material in commercial agronomic practice are either to align it in alternate rows or banks or to leave it untouched in the field. Landrau *et al.* (2) have found that the practice of leaving sugarcane trash undisturbed on a lateritic Coto clay soil compares favorably with either aligning the trash or burning it.

Where cane trash is left undisturbed on the field the farmers have wanted to know the best practice for applying fertilizer. Some farmers use the older system of moving the trash away from the base of the cane stool and applying the fertilizer at its base. Other growers, with an eye to economy, favor broadcasting the fertilizer over the cane-trash blanket without manipulating the trash in any manner.

It is the purpose of this paper to report on an experiment designed to determine the best method of fertilizing undisturbed trash. The system of aligning trash as against that of leaving it untouched is also compared.

## PROCEDURE

The experiment was planted with sugarcane variety H. 328560 on Vega Alta clay at the Agricultural Experiment Station at Río Piedras. The Vega Alta clay is a highly leached, heavy, slightly plastic clay with a mottled, less permeable subsoil. The experiment was planted on October 13, 1953, and the plant crop harvested 16 months later on January 31, 1955. The trash of the plant crop was subjected to the following treatments:

1. The trash was aligned in alternate banks, a shallow furrow was opened in the center of the clean banks, and fertilizer was applied to the base of each stool.

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<sup>2</sup> *Italic numbers in parentheses refer to Literature Cited, p. 91.*

2. The trash was aligned in alternate banks, but no shallow furrow was opened, and the fertilizer was applied to the base of each stool.

3. The trash was left untouched except for moving it away from the base of each stool, and then fertilizer was applied to the base of each stool.

4. The trash was left untouched and the fertilizer was broadcast over the surface of the trash.

The size of each plot was 24 feet by 30 feet or about  $\frac{1}{60}$  acre. There were six rows 4 feet apart in each plot. Thirty-three-eyed sugarcane seed pieces were used per furrow. The seed pieces were placed in the bottom of the furrow and covered with soil.

The plots were fertilized at the rate of 1,500 pounds per acre of a 15-4-7 formula per crop. The fertilizer was applied as specified under the various treatments no later than 1 month after cutting the ratoon.

Three ratoons were harvested from the experiment. The first was out on January 24, 1956, at 12 months of age; the second on February 25, 1957, at 13 months; and the third on March 2, 1958, at 12 months.

## RESULTS

The yields of 96° available sugar and tons of cane per acre are given in tables 1 and 2, respectively. The yields for the plant cane are not presented inasmuch as the treatments were not initiated until the ratoon crops began.

In terms of both sugar and cane tonnage per acre, there were no significant differences between treatments for any of the three ratoon crops. The measured differences between treatments were never higher than 0.40 ton of sugar or 2 tons of cane per acre.

The fact that yields of sugar per acre are not influenced by aligning or leaving the cane trash untouched has a significant economic meaning to the sugarcane grower. With the ever-increasing rates of pay for hand labor, the alignment of cane trash in the field has become almost prohibitive economically. The practice of aligning cane trash can be eliminated from field practices in areas where irrigation is not practiced. Leaving the trash untouched does not affect the yields adversely.

If the sugarcane trash is to be left untouched on the field after cutting the sugarcane, the question arises as to what is the best manner of fertilizing the sugarcane. Most growers have always applied their mixed commercial fertilizer at the base of the cane stool. When the trash is left undisturbed, the growers have usually moved it away from the cane stool, making a little nest. This practice requires much hand labor. A more economical practice is to spread the fertilizer broadcast over the trash either by hand or, at even less expense, using a fertilizer spreader. As seen in tables 1 and 2, both practices of applying the fertilizer are equally good insofar as cane yields are concerned. Therefore, to save money and labor, the application

TABLE 1.—*Sugar yields (tons) of experiment on trash handling as affected by fertilizer applications*

| Treatment No. | Treatment  | Yield of 96° available sugar per acre for— |               |              |                    |
|---------------|--|--|---------------|--------------|--------------------|
|               |  | First ratoon                               | Second ratoon | Third ratoon | Average of 3 crops |
| 1             | Trash aligned in alternate banks with shallow furrows opened in the centers of the cleaned banks | 7.87                                       | 7.16          | 7.55         | 7.53               |
| 2             | Trash aligned in alternate banks; no furrows in clean bank                                       | 8.08                                       | 7.54          | 7.75         | 7.79               |
| 3             | Untouched trash plus fertilizer applied at the base of the stool                                 | 7.84                                       | 7.48          | 7.45         | 7.59               |
| 4             | Untouched trash plus fertilizer applied broadcast on top of the trash                            | 7.90                                       | 7.34          | 7.75         | 7.66               |

TABLE 2.—*Cane yields (tons) of experiment on trash handling as affected by fertilizer applications*

| Treatment No. | Treatment  | Yield of sugarcane per acre for— |               |              |                    |
|---------------|--|----------------------------------|---------------|--------------|--------------------|
|               |  | First ratoon                     | Second ratoon | Third ratoon | Average of 3 crops |
| 1             | Trash aligned in alternate banks with shallow furrows opened in the centers of the clean banks | 66                               | 56            | 58           | 60                 |
| 2             | Trash aligned in alternate bank; no furrows in clean banks                                     | 66                               | 58            | 58           | 61                 |
| 3             | Untouched trash plus fertilizer applied at the base of the stool                               | 67                               | 59            | 59           | 62                 |
| 4             | Untouched trash plus fertilizer applied broadcast on top of the trash                          | 67                               | 58            | 60           | 62                 |

of the fertilizer broadcast over the trash is to be preferred over moving the trash and applying the fertilizer at the base of the cane stool.

The practice of leaving the cane trash untouched is to be used only with sugarcane varieties which are vigorous germinators and ratooners. The trash blanket can smother out a poor germinating cane variety requiring considerable expenditures for replanting.

#### SUMMARY

Sugarcane variety H. 328560 was grown for four crops on a Vega Alta clay at the Solís Farm of the Agricultural Experiment Station at Río Piedras to test four methods of handling the sugarcane trash. The methods of trash manipulation employed were as follows: 1, Trash aligned in alternate banks with a shallow furrow opened in the center of each clean bank; 2, trash aligned in alternate banks with no furrows opened in the centers of the clean banks; 3, untouched trash plus fertilizer applied at the base of each stool; 4, untouched trash plus fertilizer applied broadcast on top of the trash.

The results with the three ratoons harvested revealed no significant differences in yields of sugarcane tonnage or sucrose per acre among the four treatments used. This indicates that, for cane growing in areas of sufficient rainfall in Puerto Rico, savings in labor costs can be obtained by not aligning the trash. Further savings in costs can be made by applying the fertilizer broadcast by machine over the cane trash.

Leaving the trash untouched in the field is not recommended for cane varieties which are poor germinators or for irrigated cane.

#### RESUMEN

Con el objeto de probar cuatro métodos para manejar la paja de caña, se llevó a cabo un experimento con la variedad H.328560 en un suelo del tipo Arcilla Vega Alta, en la finca Solís de la Estación Experimental Agrícola en Río Piedras.

Los métodos usados en la manipulación de la paja de caña, fueron como sigue:

1. Paja alineada en bancos alternados con un surco llano abierto en el centro de cada banco limpio.

2. Paja alineada en bancos alternados sin abrir surcos en el centro de los bancos.

3. Paja dejada en el sitio donde se cortó, a la cual se le añadió abono en la base de cada cepa.

4. Paja dejada en el mismo sitio donde se cortó y abonada al voleo.

Los resultados de los tres retoños cosechados no revelaron diferencia sig-

nificativa alguna en su tonelaje de caña o de sacarosa por acre, en los cuatro tratamientos usados.

Esto indica que para caña sembrada en áreas de suficiente lluvia se puede economizar en los costos de producción al no tener que alinear la paja. Esta economía puede resultar si se aplica sobre la paja abono al voleo por medio de máquinas.

No se recomienda dejar la paja en el sitio donde se corte, si en esa área las cañas germinan pobremente o están bajo riego.

#### LITERATURE CITED

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3. Samuels, G., Lugo-López, M. A., and Landrau, P., Jr., Influence of the handling of sugarcane trash on yields and soil properties, *Soil Sci.* **74** (3) 207-15, 1952.