THE INFLUENCE OF PLANT SEASON AND AGE AT HARVEST ON THE PRODUCTIVITY OF THE THREE SUGARCANE VARIETIES AT MUMIAS, KENYA

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ABSTRACT

Under the conditions at Mumias, Kenya, the amount and seasonal distribution of rainfall received by the crop is the main natural parameter affecting cane productivity, quality and consequently rate of sugar accumulation. The data presented in this paper indicate that the optimum age for harvesting the April plant crop is 84 weeks. Sugarcane planted in June should not be harvested before 84 weeks; however, thereafter sugar productivity is maintained until 100 weeks from planting.

October planted cane shows a steadily increasing rate in sugar production from 68 to 100 weeks. Considering the varieties separately, NCo 376 shows a peak in sugar productivity at 84 weeks. In comparison, the sugar production curves for Co 421 and Co 775 are very much less defined; consequently allowing greater flexibility in their harvest age. No optimum harvest age is indicated by the first ratoon results, thus affording valuable flexibility in the management of ratoon crop harvests. There is a seasonal preference for the planting of the three varieties, with NCo 376 leading Co 421 and Co 775 in the April and June plantings, while Co 421 has the highest cane productivity following October planting. While Co 421 produces more cane than the other two varieties in the first ratoon, its low juice quality results in there being no significant differences between varieties in sugar production. The practical applications of the results are considered.

INTRODUCTION

The work reported in this paper was initiated in 1975 when NCo 376 and Co 775 were recommended as meritsing commercial propagation in addition to the variety Co 421. During the conduct of the feasibility studies, highly significant linear

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yield increases with age were found in Co 421, as well as some indications that the planting season might be important. Subsequent trial results with NCo 376 and Co 775 had indicated that they were early maturing. It was, therefore, decided to determine the effect of time of planting on cane yield, and the maturation of these main varieties with a view to ascertain their optimum ages for harvest in order to maximize economic sugar production.

The data were collected by the Agronomy Section of the Mumias Sugar Company, whose estate is situated in the north-western part of Kenya at about 1,300 m above sea level. The mean annual rainfall over the past 11 years has been 2,000 mm. There is generally a long rainy season period from March to June, and a second rainy season in October. The intervening months are slightly drier — especially July; but the real dry season starts in November lasting through February. Mumias enjoys relatively uniform temperatures throughout the year, with the mean maximum monthly temperatures ranging from 27.6°C in July to 31.3°C in January. The mean minimum temperatures range from 13.3°C to 15.2°C. Daily evaporation varies slightly throughout the year, with the mean monthly values reaching the lowest values in July (3.8 mm/day) and the highest values in February and March (5.7 mm/day). The mean relative humidities have varied between 58.5% and 73%.

**EXPERIMENTAL PROCEDURE**

This experiment was conducted in upland soil in a randomized split-plot design with two replications. Three whole plots for each season were planted in June and October 1975, and April 1976, with the varieties under test — Co 421, Co 775 and NCo 376. Each varietal plot was divided into five randomly allocated sub-plots of ages at harvest. The gross sub-plots were four rows of 10 m at 1.67 m spacing, and the net sub-plots were two rows of 7 m.

Fertilizer was applied at the following rates to ensure optimum nutrition:

<table>
<thead>
<tr>
<th>Crop</th>
<th>Timing</th>
<th>N</th>
<th>Carrier</th>
<th>P₂O₅</th>
<th>Carrier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant</td>
<td>At planting</td>
<td>52 kg/ha</td>
<td>CAN</td>
<td>105 kg/ha</td>
<td>SSP</td>
</tr>
<tr>
<td></td>
<td>At 5-6 months</td>
<td>39 kg/ha</td>
<td>CAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First ratoon</td>
<td>Following plant crop</td>
<td>52 kg/ha</td>
<td>ASN</td>
<td>50 kg/ha</td>
<td>SSP</td>
</tr>
<tr>
<td></td>
<td>harvest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>At 5-6 months</td>
<td>39 kg/ha</td>
<td>ASN</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As soil analyses showed adequate K concentration (0.4 me), no potash fertilizer was required.

The sub-plots were harvested at two monthly intervals from 16 to 24 months of age in the plant crop, and 15 to 23 months of age in the first ratoon crop. The net plot cane yields were recorded at harvest; and the pol percent juice together with the other components of juice quality were determined on samples of 12 randomly selected stalks from each net plot. These data were used to derive
<table>
<thead>
<tr>
<th>Harvest data Plant Crop TC/ha/week</th>
<th>Brix%</th>
<th>ERS%</th>
<th>Juice purity</th>
<th>Fiber % Canes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Varieties</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCo 376 (A&lt;sub&gt;1&lt;/sub&gt;)</td>
<td>2.12</td>
<td>0.26</td>
<td>20.4</td>
<td>12.30</td>
</tr>
<tr>
<td>Co 775 (A&lt;sub&gt;2&lt;/sub&gt;)</td>
<td>1.86</td>
<td>0.22</td>
<td>20.1</td>
<td>12.00</td>
</tr>
<tr>
<td>Co 421 (A&lt;sub&gt;3&lt;/sub&gt;)</td>
<td>2.03</td>
<td>0.22</td>
<td>18.7</td>
<td>10.56</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>± 0.13</td>
<td>± 0.02</td>
<td>± 0.9</td>
<td>± 1.3</td>
</tr>
<tr>
<td>Coefficient of variation %</td>
<td>6.60</td>
<td>8.70</td>
<td>4.6</td>
<td>1.5</td>
</tr>
<tr>
<td>Seasons</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>June (B&lt;sub&gt;1&lt;/sub&gt;)</td>
<td>1.72</td>
<td>0.19</td>
<td>19.4</td>
<td>10.72</td>
</tr>
<tr>
<td>October (B&lt;sub&gt;2&lt;/sub&gt;)</td>
<td>2.12</td>
<td>0.26</td>
<td>20.0</td>
<td>12.12</td>
</tr>
<tr>
<td>April (B&lt;sub&gt;3&lt;/sub&gt;)</td>
<td>2.18</td>
<td>0.26</td>
<td>19.8</td>
<td>12.02</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>± 0.25</td>
<td>± 0.04</td>
<td>± 0.3</td>
<td>± 0.78</td>
</tr>
<tr>
<td>Coefficient of variation %</td>
<td>12.45</td>
<td>16.67</td>
<td>1.4</td>
<td>1.8</td>
</tr>
<tr>
<td>Ages at harvest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>67.8 weeks (C&lt;sub&gt;1&lt;/sub&gt;)</td>
<td>2.06</td>
<td>0.22</td>
<td>18.3</td>
<td>10.31</td>
</tr>
<tr>
<td>75.8 weeks (C&lt;sub&gt;2&lt;/sub&gt;)</td>
<td>2.18</td>
<td>0.25</td>
<td>19.5</td>
<td>11.16</td>
</tr>
<tr>
<td>83.8 weeks (C&lt;sub&gt;3&lt;/sub&gt;)</td>
<td>2.02</td>
<td>0.25</td>
<td>20.1</td>
<td>12.36</td>
</tr>
<tr>
<td>91.8 weeks (C&lt;sub&gt;4&lt;/sub&gt;)</td>
<td>1.93</td>
<td>0.23</td>
<td>20.2</td>
<td>12.02</td>
</tr>
<tr>
<td>99.8 weeks (C&lt;sub&gt;5&lt;/sub&gt;)</td>
<td>1.84</td>
<td>0.22</td>
<td>20.5</td>
<td>12.27</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>± 0.13</td>
<td>± 0.02</td>
<td>± 0.9</td>
<td>± 0.87</td>
</tr>
<tr>
<td>Coefficient of variation %</td>
<td>6.90</td>
<td>8.70</td>
<td>4.6</td>
<td>2.6</td>
</tr>
</tbody>
</table>

Note: Duncan’s Multiple Range Test @ P < 0.05
estimated recoverable sugar percent cane (ers%), and tons estimated sugar per hectare (ters/ha).

Unfortunately, no first ratoon results were available for the cane initially planted in April because of mill closure prior to this treatment’s scheduled harvest.

**RESULTS**

*Plant Crop*

**Variety and Variety x Season of planting interaction**

Averaged over season and ages at harvest, cane productivity of NCo 376 was slightly but not significantly higher than that of Co 421, and is significantly better than that of Co 775. The differences are more marked in sugar production, as Co 421 has a significantly lower quality. Consequently, the rate of sugar production of NCo 376 is 18% higher than Co 775 and Co 421 (Table 1).

The varietal x planting season interaction showed that the superiority of NCo 376 in cane productivity was not invariable. NCo 376 was distinctly superior in the June planting, superior in the April planting, but slightly inferior to Co 421 in the October planting. This interaction, data for which are shown in Table 2, is highly significant ($P < 0.01$).

**TABLE 2.** Season of planting x varieties — cane productivity (tc/ha/week) across ages of cane at harvest

<table>
<thead>
<tr>
<th>Variety</th>
<th>April</th>
<th>June</th>
<th>October</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCo 376</td>
<td>2.40</td>
<td>1.87</td>
<td>2.11</td>
<td>2.13</td>
</tr>
<tr>
<td>Co 775</td>
<td>1.89</td>
<td>1.61</td>
<td>2.09</td>
<td>1.86</td>
</tr>
<tr>
<td>Co 421</td>
<td>2.25</td>
<td>1.68</td>
<td>2.17</td>
<td>2.03</td>
</tr>
<tr>
<td>Mean</td>
<td>2.18</td>
<td>1.72</td>
<td>2.12</td>
<td></td>
</tr>
</tbody>
</table>

**Season of planting**

June planting results in significantly lower productivities of both cane and sugar, and in lower quality (Table 1). Some caution is necessary however, in interpreting the magnitude of these effects as the coefficient of variation are high.

**Age at harvest**

The cane was harvested at five ages in increments of eight weeks, from
67.8 to 99.8 weeks of age. Regression analysis indicated a definite negative linear relationship between tcl/ha/week and age (P < 0.001). However, the age x planting season interaction was equally significant, so that the three planting dates must be considered separately.

In the June-planted cane (i.e., the season of lowest productivity), cane yield/week increased with age of harvest (r = +0.849, P < 0.05). In the April-planted cane the reverse was true (r = -0.926, P < 0.01), the rate of decline in this season was double the rate of increase in the June-planted cane (0.019 compared to 0.008 tcl/ha/week per week delay in harvest). No significant relationship could be found for the October planting. These data are illustrated in Fig. 1.

In contrast, cane quality improved with age, at least up to 84 weeks of age. Average for all seasons of planting, both the linear and the quadratic components of the regression between age and ers% were significant (both with P < 0.001). Similarly, the regression between age and ters/ha/week showed significant linear (P < 0.001) and quadratic (P < 0.05) components.

Again, responses differed with season of planting. In the April planting, the relationship was definitely quadratic, with both linear and quadratic components being significant. For the June planting only the linear component achieved significance (r = +0.90, P < 0.01), but the data shown in Fig. 2 illustrate that cane quality appears to peak at about 84 weeks for both planting seasons.

No relation was found between age and quality in the October planting.

Conversion of the cane and quality data into ters/ha/week is given in Fig. 3.
Clearly, the efficiency of sugar production peaks at about 84 weeks in the April-planted cane; while in June-planted cane the rate of sugar productivity is maintained from 84 to 100 weeks, albeit at a lower level (Fig. 3).

The October planting appears to increase production efficiency with age (r = +0.894, P < 0.01), but the slope of the line is very small, the rate of productivity improving by only 0.04 t/ha/week over the 32-week period.

All three varieties show a peak of efficiency in production at about 84 weeks. This is most marked in NCo 376 which at this age, outyields the other varieties by about 0.03 t/ha/week, or 14% (Fig. 4).

**First Ratoon Crop**

**Variety and Variety x Season of planting interaction**

The average for all seasons of planting and ages at harvest, the cane pro-
FIGURE 3. TERS/ha/weeks Season of planting x Ages at harvest

FIGURE 4. TERS/ha/week Varieties x Ages at harvest
ductivity of Co 421 was higher than that of NCo 376 (albeit not significantly so), and significantly higher than that of Co 775. However, because cane quality was lowest in Co 421, there were no significant differences in sugar production between the varieties (Table 3).

In contrast to the plant crop, there were no significant interactions between varieties and seasons of planting in the first ratoon crop. However, there was an overall increase in the rate of cane production from plant to first ratoon (Tables 2 and 4).

### TABLE 4. Season of planting x varieties - cane productivity (tc/ha/week) across ages of cane at harvest

<table>
<thead>
<tr>
<th>Variety</th>
<th>June</th>
<th>October</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCo 376</td>
<td>2.29</td>
<td>1.97</td>
<td>2.13</td>
</tr>
<tr>
<td>Co 775</td>
<td>2.11</td>
<td>1.97</td>
<td>2.04</td>
</tr>
<tr>
<td>Co 421</td>
<td>2.43</td>
<td>2.21</td>
<td>2.32</td>
</tr>
</tbody>
</table>

**Season of planting**

June-planted cane had higher rates of cane productivity, of lower quality than that planted in October, however, none of the differences recorded in Table 3 were significant.

**Age at harvest**

Since the plant crop had been harvested at five ages in increments of eight weeks, first ratoon crop was also of different ages when each season’s treatments were harvested all at once. The order of maturity was, however, reversed so that the oldest plant harvest age treatment became the youngest first ratoon treatment.

Considering the two ratooning dates separately, negative linear regressions were shown for cane productivity (Fig. 5). In the June-planted cane production declined with age at harvest at a rate of 0.13 tc/ha over 32 weeks ($r = -0.976$, $P < 0.001$), while October-planted cane depreciated at more than twice this rate over the same period @ 0.29 tc/ha ($r = -0.929$, $P < 0.01$).

In contrast, cane quality improved with age (see Table 3). Average over both seasons of planting, the linear component of the regression between age and rs%c was highly significant ($P < 0.001$). Considering the two ratooning dates separately, the linear component achieved significance for both (June @ $r = 0.943$, $P < 0.01$ and October @ $r = 0.964$, $P < 0.001$). Figure 6 illustrates these data.
### TABLE 3. Harvest Date of Sugar Cane Ratoon Crop as affected by varieties, seasons and ages at harvest.

<table>
<thead>
<tr>
<th>Varieties</th>
<th>Harvest data</th>
<th>First ratoon crop</th>
<th>Juice purity</th>
<th>Fiber % cane</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TC/ha/week</td>
<td>TERS/ha/week</td>
<td>Brix%</td>
<td>ERS%C</td>
</tr>
<tr>
<td>NCo 376 (A₉)</td>
<td>2.13 ab</td>
<td>0.25</td>
<td>21.0 a</td>
<td>11.68 a</td>
</tr>
<tr>
<td>Co 775 (A₁₉)</td>
<td>2.04 b</td>
<td>0.23</td>
<td>20.9 a</td>
<td>11.47 ab</td>
</tr>
<tr>
<td>Co 421 (A₂₉)</td>
<td>2.32 a</td>
<td>0.24</td>
<td>18.6 b</td>
<td>10.44 b</td>
</tr>
</tbody>
</table>

Standard deviation:
- ± 0.28
- ± 0.01
- ± 0.8
- ± 0.66
- ± 1.3
- ± 0.5

Coefficient of variation %:
- 6.47
- 4.17
- 3.9
- 5.89
- 1.4
- 3.4

Seasons:
- June (B₉)
  - 2.28
  - 0.25
  - 20.2
  - 11.10
  - 89.7
  - 14.7
- October (B₁₉)
  - 2.05
  - 0.23
  - 20.8
  - 11.29
  - 89.7
  - 15.1

Standard deviation:
- ± 0.16
- ± 0.01
- ± 0.4
- ± 0.13
- ± 0.3

Coefficient of variation %:
- 7.37
- 4.17
- 2.0
- 1.16
- 2.0

Ages at harvest:
- 93.1 weeks (C₉)
  - 2.03
  - 0.24
  - 21.4 a
  - 11.99 a
  - 91.5 a
  - 15.2
- 85.1 weeks (C₁₉)
  - 2.20
  - 0.25
  - 21.0 ab
  - 11.57 ab
  - 90.9 ab
  - 15.5
- 77.1 weeks (C₂₉)
  - 2.12
  - 0.23
  - 20.5 bc
  - 10.87 b
  - 89.2 bc
  - 15.6
- 69.1 weeks (C₃₉)
  - 2.16
  - 0.23
  - 19.9 cd
  - 10.79 b
  - 88.8 cd
  - 14.5
- 61.1 weeks (C₄₉)
  - 2.31
  - 0.25
  - 19.6 d
  - 10.75 b
  - 88.2 d
  - 13.7

Standard deviation:
- ± 0.10
- ± 0.01
- ± 0.7
- ± 0.56
- ± 1.4
- ± 0.8

Coefficient of variation %:
- 4.63
- 4.17
- 3.4
- 5.00
- 1.6
- 5.4

Note: Duncan’s Multiple Range Test @ <0.05
There was no significant decline in the rate of sugar production (t/ha/week) with age at harvest across ratooning dates (Table 3); nor was there when the ratooning dates were considered (Fig. 7).

To facilitate the interpretation of the results, the planting and harvesting dates of the plant and first ratoon crops are shown in Figure 8, together with monthly rainfall and temperature data.

**Plant crop**

Of the three varieties, NCo 376 had the highest rates of cane and sugar production when expressed at t/ha/week, (Table 1 and Fig. 4). Unfortunately, no definite conclusions can be drawn on the cane production, and consequently sugar productivity in relation to season of planting because of high coefficients of variation. Nevertheless, the relatively lower temperatures and rainfall during the June-planting resulted in the lowest productivity of the seasonal plantings (Fig. 8 and Table 1).

The data in Table 2 indicate a significant varietal x season of planting interaction in the first ratoon crop.
Initially planted in June
Initially planted in October

FIGURE 7. TERS/ha/week — First ratoon
Ratooning dates x Ages at harvest

duction of April-planted cane declined in relation to increasing age at harvest. Conversely, ers% increased to a peak of approximately 12.4 at 84 weeks from planting thereafter declining (see Figure 2). Consequently, sugar productivity also reached a maximum 84 weeks after planting (See Figure 3).

The decline in April-planted cane production is correlated with the rainfall received by the crop two months prior to and during the five sequential harvests (Fig. 8). In contrast, the June-planted cane production increased in relation to age at harvest, albeit at a low rate (Fig. 1), while the rate of ers% increase in relation to age at harvest was much greater (Fig. 2). Though the cane production and ers% data have significant correlation coefficients ($r = +0.849 \ P < 0.05$ and $r = +0.900 \ P < 0.001$), respectively, their relationships with time indicate curvi-linearity (Fig. 1 and 2) — the point of flexure being at approximately 84 weeks after planting. The fact that sugar productivity would also appear to reach a plateau 84 weeks after planting in June-planted cane supports this observation (Fig. 3).

The rainfall recorded during March through June 1977 influenced the cane
FIGURE 8. Planting and Harvesting Dates (Plant and First Ratoon Crop) including Monthly Rainfall and Temperature Data
production and ers%c data for the 1975 October planted cane (Fig. 8); consequently no significant relationship was demonstrated for these two parameters with respect to age at harvest (Fig. 1 and 2). There was a significant correlation coefficient for the ters/ha/week data ($r = +0.894 \) at $P < 0.01). These data are illustrated in Fig. 3. Consequently, the data indicate that the age plant cane should be harvested as affected by the season of planting. While the rate of sugar production increased steadily over the 32 weeks of the trial in October-planted cane; in June-planted cane, maximum sugar productivity was reached at 84 weeks after planting, and was maintained at this rate thereafter. In contrast, there was an optimum time (84 weeks) for the harvest of April-planted cane. Irrespective of the season of planting, Fig. 4 shows that the peak in sugar production for NCo 378 occurs approximately 84 weeks after planting. In contrast, the sugar productivity curves are much flatter for Co 421 and Co 775, indicating that the plant crop harvest of both varieties can be delayed beyond 84 weeks without incurring appreciable losses in sugar yield.

First ratoon yield

The cane yield advantage shown by Co 421 over the other two varieties was offset by its low quality. Consequently, there were no significant differences between rates of sugar production between varieties. The cane and sugar productivity differences between the crops initially planted in June and October were influenced by the amounts of rain received by each crop just prior to its harvest (Fig. 8). The rainfall over the March through May period 1978 while producing higher first ratoon cane yields in the June-planted cane depressed its quality compared with the October-planted cane. Conversely, the comparatively lower rainfall over the July through September period 1978 improved the quality of the October-planted cane but suppressed its productivity in the first ratoon. Fig. 5 and 6 show that while the rate of cane production decline with age ers%¢ improved. Consequently, there was no difference in the rate of sugar accumulation between cane harvested at 60 weeks and that harvested at 92 weeks.

CONCLUSIONS

As there are no wide fluctuations in either maximum or minimum temperatures, the amount and seasonal distribution of rainfall received by the crop is the main natural parameter affecting cane productivity, quality and consequently the rate of sugar accumulation under Mumias conditions (Fig. 8).

The results, so far, indicate that the largest proportion of planting should take place in April with the balance in October.

The data also show that the optimum age for harvesting the April plant crop is 84 weeks. Sugarcane planted in June should not be harvested before 84 weeks; however, thereafter, sugar productivity is maintained until 100 weeks after planting. October-planted cane shows a steadily increasing rate in sugar production from 68 to 100 weeks. Considering the varieties separately, NCo 378 showed a peak in sugar productivity at 84 weeks.
In comparison, the sugar production curves for Co 421 and Co 775 are flatter; consequently allowing greater flexibility in their harvest age. As no optimum harvest age is indicated by the first ratoon results, additional valuable flexibility is allowed in the management of ratoon crop harvests under the conditions obtaining at Mumias, increasing the harvest age of any crop class consequently decreases the cost of sugar production from it. In seasons of good growth following wet seasons when the subsequent cane yields will be high. No appreciable losses in sugar yield should be recorded if the cane is harvested at two years old. In contrast the data indicate that ratoon crop harvests could be brought forward to 80 weeks from cutting the previous crop following a drought or a season of sub-normal rains when subsequent growth would have been poor. In such a situation the early harvest of the ratoons will enable the following ratoon to profit from subsequent rains.

To further evaluate this trial, so that more comprehensive recommendations can be made, the harvest results of a complete cycle (plant plus three ratoons — the current estate of practice) should be studied.

REFERENCE


LA INFLUENCIA DE LA TEMPORADA Y EDAD DE COSECHA, EN LA PRODUCTIVIDAD DE LAS TRES VARIEDADES DE CAÑA DE AZUCAR EN MUMIAS, KENYA

P. P. M. Mutanda, J. M. S. Makatiani, J. L. Lamasia y Glyn L. James

RESUMEN

Bajo las condiciones prevaleciente en Mumias, la cantidad y distribución estacional de la lluvia recibida por la cosecha es el principal parámetro natural que afecta la producción cañera, calidad y consecuentemente el contenido de azúcar acumulado. Los datos presentados en este trabajo indican que la edad óptima para cortas de la cosecha sembrada en Abril, es a las 84 semanas. La caña de azúcar sembrada en Junio no debe ser cosechada antes de las 84 semanas; sin embargo, a partir de entonces la producción de azúcar es mantenida hasta 100 semanas luego de sembrada. La caña sembrada en Octubre presenta un continuo aumento en la producción de azúcar de las 68 a 100 semanas. Considerando las variadas separadamente, NCo 376 demuestra una producción máxima en productividad de azúcar a las 84 semanas. En com-
paración, las curvas de producción de azúcar para Co 421 y Co 775 son menos definidas, por consiguiente permitiendo una mayor flexibilidad en su edad de cosecha. La edad óptima de cosecha no es indicada por los resultados en retoño, por lo cual proporciona una apreciable flexibilidad en el manejo de la cosecha del retoño. Hay una preferencia estacional para la siembra de las tres variedades, con NCo 376 preferentemente sobre Co 421 y Co 775 en la siembra de Abril y Junio, mientras la Co 421 tiene la mayor productividad de caña en primer retoño que las otras dos variedades, la baja calidad da su jugo de lugar a que no haya diferencia significativa en la producción de azúcar entre las variedades. La aplicación práctica de los resultados son considerados.