Notes on the Agricultural Qualities of the Sugar Canes now Commercially Grown in South Africa.

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Recently there has been much discussion and much difference of opinion regarding the best varieties of cane to plant in the different districts, and under the various conditions of soil and climate in the sugar growing belt of Natal and Zululand. That being so, the following notes on the various varieties at present available for commercial planting are offered by the writer, who hopes they may lead to a discussion on this most important question.

Before 1931 the only variety allowed to be cultivated commercially was Uba. In that year the following varieties were released for general planting, and small quantities of seeds were distributed from the Experiment Station; P.O.J. 2714, P.O.J.2725, P.O.J.2727, P.O.J.2878, Co.290, and C.H. 64/21.

Two years later Co.281 was first distributed, and in 1935 this was followed by Co.301.

Uba.

Uba cane had been practically the only variety grown for about fifty years before these new varieties were introduced, and with it the sugar industry had been built up from small beginnings to a large, flourishing industry. Latterly, a very large percentage of the Uba cane in the country had become infected with streak disease, and yields were not so good as they had been. When some of the new canes proved capable of yielding much better returns than Uba, as they very soon did, less and less areas of new plantings were made with Uba, and the area under it is rapidly diminishing.

Co.290.

Of the first six varieties to be distributed, Co.290 early came into prominence. It proved definitely superior to Uba under nearly all conditions found in the sugar belt, and very good indeed on certain kinds of soil.

This variety prefers a deep, rather loose-textured soil. It is only moderately drought-resistant, and is rather easily damaged by stagnant water. If planted on heavy soils liable to have water standing on them at times, it will often produce a good plant cane crop, but ratoon rather badly.

It has a heavy top of long, spreading leaves, and being also a quick grower, it covers the ground quickly, thus requiring little cultivation.

Given good growing conditions, it is capable of producing very useful crops in one growing season of about twelve months. A few years ago, when all planters were able to send to the mill as much cane as they could take off, much Co.290 was harvested as a one year crop.

Under those conditions the cane was, as a general rule, satisfactory, both as regards sucrose content and freedom from disease.

When allowed to grow for a two year old crop, the results have not been so uniformly satisfactory, although some two-year-old Co.290 has been very good indeed. This cane attains its best condition for harvesting at an earlier period in its growth than most other varieties. The optimum stage is not always reached at the same age. It can only be determined by close observation and by tests for sucrose, etc.

If Co 290 cane is allowed to stand over in the field much beyond this optimum stage it may deteriorate quickly. The nature and speed of deterioration vary with soil and weather conditions. This tendency to deteriorate has caused much trouble recently, as it has been found impossible to harvest all canes at the best age owing to restriction of output. This has given Co.290 cane a bad reputation in some quarters, which it does not fully deserve. It is still a very good cane for the sandy soils near the coast, and for various other soils where it has been found to do well.

Co.281.

Co. 281 cane did not come into prominence so early as Co.290, owing to its being released later from the Experiment Station. In the early days planters objected that its upright leaf growth prevented the crop from covering the ground as quickly as Co.290, and made more weeding necessary. As time went on, its good qualities became apparent, and recently it has been planted on larger areas than any other variety. It is more drought-resistant than Uba, and also seems more frost resistant. It is a vigorous grower, tolerates a wide range of soil conditions, and yields cane of a high average quality. When planting it the rows can be spaced somewhat closer together than for other varieties to help minimise weeding.

It does not give better yields than Co.290 at its best, but is considered a more generally safe cane for all soils, and it keeps over well for a two-year

crop. It also can be harvested as a one-year crop under good conditions. It has proved a very good cane for thin, shaly soils, and for all rather shallow or stiff soils where drought-resistance is important.

Co.301.

Co 301 was only released from the Experiment Station in 1935. It has not been planted up so rapidly as the two former varieties were. At present it does not occupy a very large percentage of the total cane area, and comparatively little has so far been sent to the mills. It is, therefore, not possible to gauge its agricultural value so accurately.

It carries a very heavy foliage of long, light green leaves, and produces a large number of sticks per stool. Like Co.290, it quickly covers the ground and keeps down weeds. It has the drawback of being a very brittle cane. It is easily flattened by wind and rain if it has made rapid, heavy growth, and a varying percentage of the canes fracture and snap when it falls down. This has made certain planters harvest it as soon as possible because they feared many sticks would die. Last season when a good deal of this flattening occurred, it was found that there were not very many dead sticks. When it was allowed to remain until it had been down several months, and the sucrose improved in the meantime, so early harvesting of fallen cane is not recommended.

At the Experiment Station the sucrose tests of this cane have not been significantly different from those of Co.281 and Co.290. The same experiments also show it to be at least as good a yielder as the other two over quite a wide range of soils. It cannot yet be said definitely that it is better than either of the two previous varieties under any set of climatic or soil conditions, but it has good qualities which make it well worth extended trial on a large scale. It is an excellent ratooner, and owing to its tendency to form large stools, it probably ought to be planted wider apart than Co.281 or even Co.290.

These three varieties now comprise a very high percentage of plantings on all cane farms except such as have rich alluvial lands.

P.O.J.2725.

P.O.J.2725 is largely planted on the alluvial lands at Umfolozi, Umhlatuzi and a few other places. It has not proved successful on hillside lands as a rule. It is a thick cane having a high average sucrose content. On rich lands it gives very heavy crops of cane as plant cane, and it ratoons well, though there is some evidence to show that it will not give so many satisfactory ratoon crops as some other varieties.

It frequently produces flowers when it is about one year old or even less. This does not matter much if it can be harvested during the season in which it flowers, but if it has to stand over another summer many of the flowered sticks either die or deteriorate in quality and considerable loss may result.

The same remarks apply to all the Co. varieties when they flower extensively. Of the Co. varieties Co.301 is most prone to flower, then Co.281, with Co.290 least liable to flower. Flowers are rarely seen on Co.290, but sometimes form inside the growing top of the cane without appearing. This is as harmful to the cane as actual flowering.

None of the Co. canes flower so frequently and extensively as P.O.J.2725.

P.O.J.2878.

P.O.J.2878 has not been very largely planted, but there are small areas of it. It is suitable for the same conditions as P.O.J.2725. Under favourable conditions for both varieties, it has not given quite such heavy crops as P.O.J.2725 when the two have been compared in trials.

It has not the tendency to flower, which is so objectionable in P.O.J.2725, so it stands over for a two-year-old crop much better. It has even been known to stand over to be three years old without much deterioration.

The other varieties distributed from the Experiment Station have not been able to hold their own with those already mentioned.

P.O.J.2714

P.O.J.2714 was found to be capable of giving good plant cane crops, but the ratoons were usually disappointing.

P.O.J.2727.

P.O.J.2727 did not prove to be so good as P.O.J. 2725 or P.O.J.2878 either in crop yield or in percentage of sucrose.

C.H.64.21.

C.H.64.21 proved very susceptible to streak disease, and was very early eliminated.

Conclusion.

The planters may now be said to have a fairly good selection of cane varieties for different soil and other conditions, a selection to which it is hoped further useful varieties may be added from time to time when their value is proved.

Summary.

Comments are made on Uba and the new varieties distributed for commercial planting by the Sugar Association within recent years showing the conditions to which each of the varieties that have proved succesful is best adopted.

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Mr. DODDS stated that this paper was one called for by the Association with a view to promoting discussion. It was a very good, short summary of the agricultural qualities of the new varieties. As it was not intended to be comprehensive, such matters as the disease resistance of these varieties was only touched on. The claims made for these varieties were very modest, especially with regard to P.O.J.2725 at Umfolozi. This variety as well as P.O.J.2878 had done remarkably well in the alluvial lands everywhere, particularly in Zululand. The yield at the Umfolozi area was 22 tons for Uba and 37 tons for all other varieties combined. The latter varieties mainly consisted of P.O.J.2725, which was one-year-old cane ' Uba in most cases being two-years-old cane. He referred to unpublished data from Umfolozi which showed that at a farm called New Areas they had in the 1937-8 season harvested an average of 77.5 tons per acre from 255 acres, and this was largely P.O.J.2725. Regarding individual field results, there was was case in which 143 tons to an acre of cane was obtained from an eight acre field of P.O.J.2725—143 tons per acre of 10 per cent. sucrose. A 27 acre field of Co.281 in the same district on U. L. O. A. Estate gave 107 tons of cane per acre of 11 per cent. sucrose. Many such examples could be cited from Umfolozi.

Dr. McMARTIN said that a common question was : "Which is the best cane ?" There was no such thing as the best cane. Each variety was suited to its own locality. With respect to the disease resistance of these varieties, they were all highly resistant to mosaic. Co.290 had become infected with streak, but no field cases of Co.281 with streak were known. Co.301 was very highly resistant. One case of streak had come to his notice in Co.301, but on planting the stool the symptoms had died out. P.O.J.2725 contracted streak only slightly. Only two cases of streaked P.O.J.2878 had come to his notice and they were found to recover.

P.O.J.2714 was extremely susceptible to leaf spot, which caused the premature death of leaves, but no more. CH.64/21 got streak very badly.

Some resistance trials, inoculating with artificially grown fungi, showed Co.281 almost entirely immune. Co.290 was extremely susceptible. Co.301 took a position rather nearer Co.281 than Co.290.

Mr. DODDS referred to a recent paper in "Facts about Sugar," by Dr. B. A. Bourne, of the United States Sugar Corporation, Florida, a prominent sugar cane breeder, in which certain yield results were given and claimed to be records for the American continent. These figures were decidedly inferior to the results from Umfolozi that were quoted just now.

The PRESIDENT pointed out that this paper was to be circulated to planters, a fact which would compensate for their being absent from this Congress. The only time they came was when we had the locusts, and then they came in their legions. That year we divided the Congress into two sections, and we had only five in the chemical section.

They all went across to the locust discussions.

That was the only time the planters had ever come in large numbers.

With regard to P.O.J.2725, it should be noted on page 19 of the discussions of the 1938 proceedings on Mr. Dodds' paper on the canes at the Experiment Station, that Umfolozi stated that the soft canes, especially P.O.J.2725, put Umfolozi on the map. That was a testimony of gratitude from Umfolozi.

The PRESIDENT concluded by asking for a hearty vote of thanks for Mr. Fowlie's paper.

(*Applause*).

Congress closed for the day.