

SUGAR CANE



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NEW SUGAR CANE VARIETIES

By **M Bennett-Easy, U Green & K McPherson**

With the appearance in the industry of orange rust disease in 2008 and the apparent development of a new strain of smut it was thought prudent to delay release of certain varieties to the industry until more information became available on their disease ratings.

Readers of Sugar Cane may recall that the worst manifestation of orange rust (*Puccinia kuenhii*) was noted then at Worthy Park where the most susceptible varieties appeared to be BJ9186, BJ7230 and BJ82156. Since then orange rust has been detected at a number of other locations – at Appleton, Golden Grove, Everglades etc – but nowhere with the intensity observed at Worthy Park. Other varieties affected somewhat are BJ7015 and Co331, none of which appears sufficiently susceptible to warrant hasty withdrawal.

This publication features four new sugarcane varieties: BJ8783, BT80311, CR892023 and BJ8841. Observations so far suggest that these may be safely introduced into commercial cultivation at this time. It should always be borne in mind however that no variety is immune to disease. Under the right circumstances all varieties may be made to show symptoms. In one location for instance, BT80311 has shown mild susceptibility to orange rust. This might not be sufficient to justify withholding what is otherwise an excellent new variety from cultivation. Given this indication, growers are therefore urged to expand this variety cautiously.

ESTABLISH NURSERIES

On receipt of any of these varieties, the first step should be to establish a nursery on the farm. Cane from first established nurseries should be used by 6-9 months to establish secondary nurseries. If a grower finds that he is unable to use nursery cane in his own planting programme, he is encouraged to offer this seed cane for sale to others so that the new varieties can be expanded as rapidly as possible.

With the revitalisation of the industry now underway in 2011, there is already tremendous demand for planting material. Planting of nurseries should therefore be

a profitable venture. Cane in nurseries should be carefully tended to avoid mixing with other varieties. Nurseries should also be inspected and rogued of any varieties that do not belong in that nursery and stools showing signs of major diseases. SIRI officers will assist in both exercises.

Several pure stand seed cane nurseries have been strategically established in all cane growing areas to facilitate rapid propagation. Growers are therefore, urged to discuss their replanting programmes with the SIRI Area Agronomist who will assist in sourcing the varieties described below:

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PROFITABLE DRIP IRRIGATION

By **E M Lewis, Clarence Fearon & Trevor Falloon**

Drip irrigation is a most advanced method of applying water. It facilitates irrigation with relatively small quantities of water through tubes running parallel to the rows. In Jamaican sugar cane, drip tubes are usually placed within the planting furrow and covered along with the seed pieces. Sometimes tubes are inserted between two rows of canes on each bank or the tube may be placed in the furrow between two rows.

ADVANTAGES

The benefits from drip irrigation are numerous. It uses less water and, if properly operated, there should be no wasteful runoff from the field. The cost of water

is consequently reduced. There is also less chance of stream pollution from irrigation runoff. Because of the reduced water use, energy costs in supplying water should therefore be also lower. As the soil surface may be only partially wet with drip irrigation, there is less encouragement of weed growth and therefore reduced weed control costs.

Drip tubes may also be used to supply nutrients directly to the root zone in a process called “fertigation” thus improving the cost effectiveness and timeliness of fertilizer application. With fertigation nutrients may even be applied when soils are still wet and when tractor drawn

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VARIETY BJ8783

Parentage B78607 x B75368

The most outstanding distinguishing characteristic of the variety is the purple leaf sheath.

BOTANICAL DESCRIPTION

Stalks: Erect in early stages but subject to lodging later, of medium thickness to fairly thick. Internodes are medium, cylindrical or slightly conoidal. Young internodes are greyish purple becoming brownish purple with age. Wax covering is well developed. Corky patches and internode cracks are absent. Bud grooves are present but not well defined. The root band is narrow and root initials are inconspicuous. Growth ring is pale purple becoming brownish purple on mature stalks.

Buds: Inserted between leaf scar and growth ring, round and flat, pale brown on immature stalks, eventually becoming brownish purple. Wings are not well developed.

Leaves: Leaf blades rather dark green and of medium length. Leaf sheath is bright purple on both young and older stalks. Auricle is well developed.

Arrows: Not available for description

AGRICULTURAL FEATURES

Germination: Rapid and reliable when young seed cane is planted but slower with older seed cane.

Tillering: Quite rapid and profuse, thereby giving excellent ground cover. Late suckering is scarce, except in lodged fields.

Growth Pattern: Elongation is quite rapid, providing good early cover.

Habit: Generally erect except in circumstances where the cane yield is high.

Trash: Loosely held

Ratooning: The variety displayed good ratooning ability across the industry

Quality: The juice quality is good. It compares favourably with BJ7314.

Adaptability: BJ8783 appears to be widely adapted. It is suited for light and clay loam soils in rain-fed and irrigated areas.

Disease Reactions: It is resistant to smut and seems fairly tolerant of orange rust.

General: BJ8783 is recommended for early to mid season reaping on clay and clay loam soils in both rain-fed and irrigated areas.



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PROFITABLE DRIP IRRIGATION

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Drip irrigation tubes in planting furrow with seed pieces before covering

equipment would get stuck in the field.

ADOPTING THE TECHNOLOGY

Drip irrigation comes with a relatively high installation cost. Although only a handful of Jamaican cane growers have so far adopted this technology, which has been around for several decades, the practice is now likely to become more widespread with funding support from the European Union (EU) in the industry rehabilitation process. Drip irrigation is so much more efficient than the traditional furrow irrigation that growers often record spectacular yield increases after switching to this technology. The problem is that huge increases in cane tonnage may sometimes not be matched by increased profitability as high yields sometimes come with poor juice quality. This needs not be so.

FACTORS AFFECTING JUICE QUALITY

In a typical cane growing cycle, the crop is initially provided enough water and nutrients to promote germination, early growth and tillering. Nutrients supplied at the beginning would form part of a soil reserve which gets used up in the rapid growth phase in the 6-8 month period when enough moisture and sunshine are also essential for maximizing yield. In preparation for harvest, there would normally be a 4-6 week drying off

period, hopefully accompanied by lower temperatures to ensure good quality at 12 months.

SOIL NUTRIENTS

Soil nutrients not used up by the time of harvest will lower juice quality. In the presence of abundant soil nutrients and moisture, cane remains in a growing phase and will not store sufficient sugar. The cane growing period varies across the world. In some industries cane may be harvested at 9 months (Louisiana); 12 months (Jamaica, Barbados); 12-18 months (India); 13-14 months (Iran); 16 months (Mauritius); 15 months (Queensland, Australia); 18 months (Durban, South Africa) and 20-24 months (Hawaii).

Industries with longer growing periods (18-24 months) have a wider window of opportunity to apply and have nutrients used up in time for maturity and ripening than those with shorter growing periods (9-12 months). The Jamaican cane grower must therefore aim to complete fertilizer application as early as possible to ensure adequate growth before ripening for the harvest. Trials have shown that split application of fertilizer, with the second treatment occurring 8 weeks after planting often produce noticeable reductions in juice quality when reaped.

Plant nutrients are made much more available when in solution in the soil.

Cane roots will actually grow towards a water source. When nutrients are provided by fertigation therefore, the crop tends to get hold of more of those nutrients than when applied in granular form to dry soil. Since the crop tends to pick up more of the nutrients, perhaps it may even be possible to reduce fertilizer dosages when applied by fertigation. This however is the subject of investigation and so no firm recommendations can be made at this time. Meanwhile, growers would best err on the side of caution and not exceed recommended dosages when carrying out fertigation.

Soluble nutrients are often more expensive than granular forms. It may be advisable therefore to apply a part of fertilizer treatment in granular formulation in the planting furrow or immediately after reaping and the supplementary dosages by fertigation. This is especially true for phosphate dressings.

Excess nitrogen in the plant is particularly problematic at ripening. To some extent the impact of nitrogen is ameliorated by a balanced supply of potash. As a general rule, leaf nitrogen should not exceed 1.2% (as determined by laboratory tests) at harvest. Levels above 1.2% frequently come with fertilizer application as late as 3-4 months after planting or reaping and signal poor juice and low cane price. Dark green, healthy looking leaves at harvest are often a give away that there might be excessive nitrogen available to the crop.

SOIL MOISTURE

Another major factor affecting cane quality is soil moisture in the period leading up to harvest. Cane is usually harvested in the dry season but often un-seasonal rains may produce poor ripening conditions resulting in poor juice quality. While the grower can do nothing to prevent rainfall, he however has influence on the application of irrigation water.

It is often very tempting to continue applying water when the growth response is so spectacular with drip irrigation. However, more and more observations suggest that with the greater efficiency

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VARIETY BT80311

Parentage: BR6466 x C 8751

BOTANICAL DESCRIPTION

Stalks: Greyish green, erect to slightly recumbent from bottom up and of medium thickness. Internodes are rather variable in length from medium to long and cylindrical. Young internodes are greyish green with heavy wax covering and well developed wax ring covering. The wax ring is often covered with black microbial deposits. There are no internode cracks. Bud grooves are absent. Root band is medium, greenish when young becoming greyish green when older. Root initials are inconspicuous and growth ring is quite pronounced and purplish in colour.

Buds: Buds are inserted between growth ring and leaf scar, round with small bud wings. Auricle is absent.

Leaves: Leaves are dark green in colour and tend to curve at tip.

Arrows: The variety appears to be non-flowering in Jamaica.

AGRICULTURAL FEATURES

Germination: Rapid and reliable

Tillering: Rapid and profuse, producing upwards of nine shoots. Late tillers are uncommon.

Growth Pattern: Elongates quite steadily with good moisture thereby providing good early ground cover and excellent control of weeds under normal growing condition.

Habit: Erect slightly recumbent from bottom up

Trashing: Self-shedding or easily stripped

Handling: Fairly soft, thick canes; easy to reap unless heavy yielding and lodged

Flowering: Appears to be non-flowering in Jamaica

Ratooning: Variety has displayed good ratooning ability.

Quality: Very good inherent juice quality during mid-season

Adaptability: Suited to clay loam and well drained clay soils in the rain-fed areas

Disease Reaction: Resistant to smut, moderately resistant to orange rust

Pest reaction: Prone to borer infestation

General: The variety appears to be well suited for mid-season reaping on clay loam and clay soils in the rain-fed areas. However, it will also achieve high levels of production in the irrigated area if water supply is adequate. High yield and quality as well as uniform growing habit make the variety an excellent candidate for mechanical harvesting.



VARIETY CR892023

Parentage: BR7304 X Poly-cross

BOTANICAL DESCRIPTION

Stalks: Erect, becoming slightly recumbent with age and of medium thickness Internodes are medium to long, cylindrical or slightly conoidal. Young internodes are purplish with well developed wax covering. Older internodes are reddish purple in colour. A few corky patches may appear on older internodes, cracks are uncommon.

Bud: The bud is ovate in shape and situated between leaf scar and bud growth ring. Bud groove absent on all internodes. Root band of medium width and root initials are well pronounced.

Leaves: Leaf blade dark green in colour, of medium length and width. Auricle well developed. Leaf sheath is purplish green with heavy wax covering.

Arrows: Sparse

Remarks: The variety has been very promising on clay and clay loam soils in the irrigated area. The most distinguishing feature is its reddish purple colour and slightly recumbent stalks.

AGRICULTURAL FEATURES

Germination: Rapid and reliable when good quality seed cane is used.

Tillering: Fairly rapid and profuse, producing 10-12 uniform tillers per stool. Late tillering has not been observed.

Growth pattern: Elongates quite steadily if moisture is adequate. Ground cover is good owing to the heavy foliage.

Habit: Semi-erect up to 75 tonnes per hectare, thereafter the variety will lodge.

Trash: Loosely-held

Handling: Soft cane easily cut and handled

Flowering: Rather light, pithiness not extensive.

Ratooning: Appears to be a fairly good ratooner.

Quality: Better than average, both in juice and fibre content.

Adaptability: Suitable for well drained soils in the irrigated area

Disease response: The variety is resistant to smut, brown and orange rust.

General: CR892023 can be distinguished by its reddish purple colour and large number of uniform tillers. It is recommended mid-season reaping on clay loam and well drained clay soils in the irrigated area



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VARIETY BJ8841

Parentage: UCW5465 x B70858

BOTANICAL DESCRIPTION

Stalk: Semi-erect and of medium thickness. Internodes are medium length and slightly zigzag. Young internodes are purplish red with medium wax covering and well developed wax ring. Old internodes are reddish purple, cracks are present. Bud groove is present but not well defined. Root band tends to be narrow, purple in colour, root initials are pronounced.

Buds: Inserted just above leaf scar and extend above growth ring, triangular in shape.

Leaves: Blade medium in length, not wider than sheath at junction, widest point about middle of blade, tapering gradually towards the tip. Blades erect bending only at tip. Leaf is dark green in colour while the leaf sheath is purplish green. Auricle present on enfolding side.

Arrows: Not observed in Jamaica

Remarks: The main distinguishing features of the variety are uniform reddish purple colour of internodes, dark green leaves and smooth leaf sheath.

AGRICULTURAL FEATURES

Germination: Quite rapid and reliable when good seed material is planted

Tillering: Characteristically rapid, producing good early cover. Few or no late suckers

Growth pattern: Steady growth up to maturity

Habit: Semi-erect at first, but semi-recumbent in heavy crop at maturity

Flowering: Non-flowering

Trashing: Easily removed trash

Handling: Soft and easily cut and handled

Quality: The juice quality is fairly good. Fibre content average

Adaptability: Suitable for clay loam and well drained soils in both rain-fed and irrigated areas.

Disease reaction: Appears, resistant to smut and rust

General: The toughness of this variety will carve out an important place for it in the irrigated area if adequate irrigation water is available. It is recommended for mid-season reaping on clay loam and clay soils in the rain-fed and irrigated areas❖



ARE WE ABOUT TO LOSE MORE CHEMICALS?

By Ed Lewis



M. Edmond Lewis

With the benefit of experience, the Jamaican cane grower knows what practices will give best results. He has learnt, for instance, that the old hand weeding methods are costly and do not give the long lasting and effective weed control that comes with the judicious use of herbicides. He has grown to depend on paraquat (Gramoxone) for control of grasses and the 2-4,D type chemicals for control of broadleaves and sedges. So when he hears that one or the other of these chemicals might be banned from use, there is understandable concern.

As it turns out, some of the rumours are not quite true, even if they might become true some time in the future.

LOCAL AUTHORISING BODY

In Jamaica, the Pesticides Control Authority (PCA) determines which chemicals are allowable for use in local agriculture. The PCA has indicated that the current herbicides used by sugarcane growers (see table) are approved. However, the old reliable atrazine (Gesaprim, Gesapax Combi, Atranex, Ametra Combi) used for pre-emergent control of broadleaf weeds has lost its registration and will not be reconsidered for use in Jamaica due to its high solubility. That solubility has resulted in its being a contaminant in many water sources in Jamaica.

At the same time, Dalapon (Dowpon, Basfofon) - a long standing hormone type grass killer has also been removed for similar reasons. Many would recall that another herbicide, MSMA (Daconate), which was used against grass weeds,

though still registered with the PCA, was long ago removed from the approved list of herbicides for use in sugar cane. Loss of these chemicals would be a big blow, had it not been for the fact that there are effective substitutes, see Table on page 12.

If any of these products which are no longer approved are now in the possession of sugar cane growers, contact the PCA at 967 1100-7; visit their website at <http://www.caribpesticides.net>; or email pca@cwjamaica.com to make arrangement for their collection and safe disposal.

What we do locally is one thing. What is happening abroad can be quite another thing. Recently, for instance, Jamaican cane farmers were introduced to the concept of growing sugar cane under the "Fair Trade" agreement that would see growers benefitting in various ways. One requirement for participating in the scheme is that farmers must abide by the rules under the "Prohibited Chemicals List." This list is designed for Europe and differs in some ways from prohibited chemicals in the US market.

INTERNATIONAL BODIES GOVERNING PESTICIDES

In fact, there are several international

conventions governing the manufacture, sale and disposal of chemicals. For instance there is the Stockholm Convention on Persistent Organic Pollutants, a Rotterdam Convention on Prior Informed Consent and a Basel Convention on Hazardous Wastes each with its peculiar focus. The important thing to remember is that restrictions posed abroad do not necessarily mean an automatic ban in Jamaica.

However, where we plan to supply sugar to a particular market, it is critical that we observe the rules pertaining to that market. For instance, our major market, Europe, sends out a questionnaire each year seeking to find out whether we are still using a rather long list of chemicals that they consider prohibited. We make sure that we comply.

SIRI in fact is guided by that list in the chemicals we test and recommend to growers.

PARAQUAT (GRAMOXONE)

If we take the case of paraquat, it remains on the list of chemicals permitted for use in Jamaica. However, we need to take note that it has been placed on the

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Tractor with boom sprayer attached

PROFITABLE DRIP IRRIGATION...

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Vigorous early growth in drip irrigated plot

of drip irrigation, a 4-6 week drying off period may be too short. To ensure proper ripening it may be necessary to extend that drying off period to 6-8 weeks instead.

Sometimes a grower stops irrigating and assumes no more water is going to his field (except from rainfall) not realising there are underground leaks keeping soil moisture high. Also, water from outside sources (such as adjoining farms) may be trickling into the field creating wet conditions long after he shuts down his system. These can counteract attempts to properly dry off the field.

SIGNS OF RIPENING

When the crop is to be harvested and

Dark green leaves indicate growing phase. Drip irrigation must be shut down before field can mature for harvest.

leaves maintain a rich luxuriant green appearance, poor juice is almost guaranteed. This is often seen in some drip irrigated fields suggesting that water supply was not cut off early enough. A field that is properly ripened should look as if it is under stress from lack of water – pale green leaves with older ones dried up and hanging from the stalk.

TEMPERATURE

Cooler night time temperatures, cloudless skies and sunny days are also important factors (over which the grower has no control) in cane ripening. These are all subject to the vagaries of nature and will therefore not

be a focus of this discussion.

SUMMARY & RECOMMENDATIONS

Drip irrigation, coupled with fertigation, has proven to be most efficient in producing superior cane yields. So efficient it is that higher yields often come at the expense of good cane quality. As the grower ends up having to pay for harvesting and transportation of vastly increased tonnages of cane of poorer quality, his profitability may drop quite sharply. This may be avoided and profitability could instead be much increased if greater care is taken to regulate those ripening factors which are under the farmer's control.

As a rule of thumb, farmers using drip irrigation should therefore seek to complete fertilizer application as early as possible after planting or reaping to allow maximum time for nutrients to be used up before harvesting. Further, since cane growth with drip irrigation tends to be so vigorous, it seems prudent to cease irrigating earlier than would be the case with furrow irrigation to ensure that the field is sufficiently dried off to allow for proper ripening. If a 4-6 week drying off period is normal for furrow irrigation, it may be safer to go for 6-8 weeks with drip irrigation. Additionally, it becomes necessary to make sure that all leaks are plugged and no water is seeping into the field to defeat the drying off process ❖



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Herbicides on register at the Pesticides Control Authority, Jamaica for use in sugarcane, June 2011			
Ingredient	Trade Name(s)	Target Weed(s)	Timing
2,4-D	2,4-D Amine; 2,4-D, 6D	Broadleaf & sedges	pre & post emergence
2,4-D+ioxynil	Actril	Broadleaf & sedges	pre & post emergence
2,4-D+dicamba	Weedmaster, Kambamaster	Broadleaf & sedges	pre & post emergence
ametryn	Ametrex, Ametryn	grass & broadleaf	pre & post emergence
ametryn+terbutryn	Amigan	grass & broadleaf	pre & post emergence
ametryn+trifloxysulfuron	Krismat	All types of weeds	early post emergence
asulam	Asulox, Asulam	grass & broadleaf	post emergence
diuron	Karmex, Diurex, Diuron	grass & broadleaf	pre & post emergence
diuron+paraquat	Gramocil	All types of weeds	mid post emergence
diquat	Reglone	withes/runners	post emergence
glyphosate	Glyphos AG	All types of weeds	post emergence
glufosinate	Finale	All types of weeds	post emergence
hexazinone	Velpar, Velzone, Hexzinone	grass & few broadleaf	pre & post emergence
isoxaflutole	Merlin	grass & few broadleaf	pre emergence
metalochlor	Dual Gold	Grasses & sedges	pre emergence
metribuzin	Sencor, Carzone	grass & few broadleaf	pre emergence
metsulfuron	Ally	broadleaf	post emergence
paraquat	Gai-Quat, Gramoxone Super, Pact Grama Pac Super, Paraquat Super, Uniquat	All types of weeds	post emergence
pendimethalin	Pendigan, Pendimethalin	grass and few broadleaf	pre emergence
sethoxydim	Nabu-S	grass	post emergence
terbutryn	Igran, Terbutrex 50 SC, Terbutrex 80 WG, Terbutryn 500 G/L SC	grass and few broadleaf	pre & post emergence

restricted list in some countries. Paraquat is especially useful for:

- » A rapid burn-down of weeds to facilitate planting of seed pieces
- » A ready indicator in spray mixtures to easily identify recently sprayed areas
- » Mixing with certain other herbicides for general control of late appearing weeds in cane fields.

The Jamaican sugar cane grower has generally used paraquat responsibly according to labelling requirements, and there have been

few reported incidences of misuse or abuse. It is ranked as Moderately Hazardous by the World Health Organisation (WHO) hence its handling should be with respirator to avoid inhalation, and wearing of gloves and coveralls/aprons for protection against contact.

CHEMICALS COME AND GO

It should be borne in mind however that many chemicals that have served us well over the years have had to be withdrawn for one reason or another as information is gathered around its use. Often

chemicals are withdrawn because they are suspected to cause cancer. In other instances, they are seen as hazardous to non-target species or tend to get taken up and become concentrated in the food chain. Sometimes they pose danger to water sources and aquatic life etc. For such reasons we must have ready alternatives so that profitable production can be sustained.

So the sugarcane grower may rest assured that, although some of the favourite and reliable herbicides may have to go, there are new ones that can do just as good a job ❖