



Co 0237 (KARAN 8) - AN EARLY MATURING VARIETY RELEASED FOR NORTH WESTERN ZONE

Co 0237 is a selection from the progeny of the Co 93016 GC. This clone was identified from seedling ratoon nursery raised at Sugarcane Breeding Institute Regional Centre, Karnal and was tested under the Pre Zonal Varietal Trial. It was selected as an early clone as it had pol % juice higher than CoJ 64 during November, January and March. Cane and sugar yields and sucrose % in juice of Co 0237 were higher than that of CoJ 64 (Fig. 1).



Fig. 1. Co 0237 (Karan 8)

Salient characteristics

Medium thick yellow canes with cylindrical internodes, ovate buds, small lanceolate auricle, bud cushion and deep bud groove. The clone is free from splits and spines on leaf sheath. Arrangement of root primordia is regular (generally single row).

Performance of Co 0237 in North Western Zone

This clone has been evaluated under the All India Co-ordinated Research Project on Sugarcane in the

North Western Zone. It ranked 1st for sucrose percentage, 4th for sugar yield and 5th for cane yield in the zone. Average cane and sugar yields, and sucrose % recorded in two plant and one ratoon crops at the seven research stations in the zone in comparison with standards are presented in Table 1. In comparison to the major check CoJ 64, it showed about 5.53%, 8.73% and 4.92% improvement in cane yield, sugar yield and sucrose % in juice, respectively.

Table 1. Summary of data of coordinated trials

Item	Co 0237	CoJ 64	CoPant 84211
Cane yield (t/ha)	71.33	67.59	66.84
% increase over checks		5.53	6.72
Sugar yield (t/ha)	9.34	8.59	8.28
% increase over checks		8.73	12.80
Sucrose (%)	18.78	17.90	17.65
% increase over checks		4.92	6.40

Co 0237 (Karan 8) has been released by the Central Sub-Committee on Crop Standards, Notification and Release of Varieties for Agricultural Crops during 2012. This variety would prove as a high quality early maturing clone. The variety is having better ratoonability as improvement in cane and CCS yields were more in ratoon crop in comparison to plant crops. Performance of Co 0237 was better when harvested during winter months. This could be a suitable substitute of CoJ 64 in the zone.

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REFINEMENT OF SUGARCANE TECHNOLOGIES

Sugarcane is a long duration crop and the returns from the crop to farmers are only after 12-14 months. Different experiments in sub-tropical India indicated 25 to 40% higher cane yield of sugarcane when planted during autumn season (September - October) over spring planting (February - March). Low temperature prevailing during winter (November - January) retards the growth of sugarcane. Further, heavy infestation of weeds has been noticed in sugarcane crop during this period. These situations provide ample scope for growing intercrops (short duration pulses, spices, vegetables, oilseeds and cereals like wheat and maize) with sugarcane. Diversification in sugarcane based cropping system is necessary to get additional income to farmers and to maintain soil health.

Intercropping of mustard with sugarcane

Mustard as an intercrop with sugarcane is a viable option in sub-tropical India. Farmers sow mustard after planting sugarcane by broadcasting method (Fig. 2 & 3). This practice was adopted by 61 farmers in Simbhaoli Sugar Mills, Simbhaoli, Uttar Pradesh when the new variety Co 0238 was introduced in the mill area. Another 26 farmers planted Co 0238 during spring season. Results of these 87 demonstrations are presented in Table 2.



Fig. 2. Sowing of mustard on ridges after 15 - 20 days of planting sugarcane

Table 2. Performance of Co 0238 in Simbhaoli Sugar Mills, Simbhaoli (UP)

Season	No. of farmers	Cane yield (t/ha)		No. of farmers who recorded >100 t/ha yield
		Range	Average yield	
Autumn	61	46.7 - 143.8	85.43	16 (26.2%)
Spring	26	58.1 - 130.9	93.45	8 (30.8%)



Fig. 3. Germinated sugarcane + mustard

Farmers have obtained an average yield of 85.43 t/ha from autumn planted crop and 93.45 t/ha from spring planted crop of Co 0238. Instead of expected 25 to 40% increase in cane yield of autumn planted sugarcane a decrease of 8.6% was observed over spring planted crop. Mustard germinates quickly and produces canopy to cover the entire area within 15 - 20 days. This condition affects the germination of sugarcane adversely. As a result the cane yield of autumn planted sugarcane was lesser compared to spring planted crop.



Fig. 4. Mustard - ready to harvest and well grown sugarcane

Refined technique

There is a need to overcome this problem of reduction in sugarcane yield when mustard is taken as an intercrop. After different observations, the following technique of raising mustard as an intercrop with sugarcane was found to be efficient:

- Planting of sugarcane during autumn season following ridges and furrows method and waiting for germination of sugarcane.
- Sowing of mustard on ridges by dibbling after 15-20 days of sugarcane planting.

Results

- Good germination and growth of sugarcane.
- 25 - 40% higher cane yield over spring planted sugarcane.
- Around 7-8q/acre yield of mustard.

Spread of the technique

Apart from farmers of Haryana and adjoining states, farmers from Hasanpur Sugar Mill, Hasanpur (Bihar) have seen the demonstration of this technology during their visit to SBI Regional Centre, Karnal. This technology is found promising in the sugarcane growing areas in subtropical parts of the country.

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Fig. 5. Mustard as an intercrop in Hasanpur Sugar Mill areas in Bihar

PSEUDO- VIVIPARY IN ALLIED GENUS OF SUGARCANE

Vivipary is the precocious germination of seeds while attached to the mother plants. Many plants especially those growing in adverse geographical situation (mangroves, sea grasses etc.) exhibit vivipary to sustain their population. In addition to vivipary, many grasses exhibit a condition called pseudo vivipary. In this case the propagules are not developed from mature seeds but develop from the floral meristem or any other vegetative tissue around it. The asexual propagules such as bulbils or plantlets replace the sexual reproductive structures. The occurrence of pseudo



Fig 6. IND 89-734 in bloom

vivipary was observed in one clone of *Neyraudia reynaudiana* (IND 89-734) in the germplasm collection maintained at Sugarcane Breeding Institute Research Centre, Kannur. This species is commonly known as burma reed, silk reed, cane grass, or false reed. It is a tall, perennial, large-plumed grass native to subtropical Asia (Fig. 6). The flowering stalks are of 2.15 to 2.8 m tall and



Fig 7. Inflorescence showing vivipary

leaves, 8 to 10 inches long and hairless, except for a tuft of hairs on the ventral side of dewlap region. Two types of stalks are observed, the stalks developed during the flowering time are generally thicker with longer internodes. Stems are 0.8 to 1.3 cm thick, round, pithy and have an internode of 7.6 to 24 cm long. The inflorescence is 85 to 115 cm long, composed of thousands of tiny flowers and have a shimmery, silky appearance (Fig. 7). At Kannur centre, flowering occurs during August to January. In an inflorescence there are hundreds of small spikelets and each spikelet consists of 6 to 7 florets (Fig. 8). In normal spikelets, the topmost florets are found to be aborted without androecium and gynoecium. About 50% of the florets produce normal reproductive structures and the remaining flowers either exhibit pseudo-vivipary (Fig. 9) without normal reproductive structures or withers away depending upon the weather situation. In normal anthers, about 70% of the pollen grains are found to take acetocarmine staining, indicating good percentage of viable pollen. Normally, humid and low temperature condition favours the induction of more viviparous spikelet. In viviparous spikelet only the

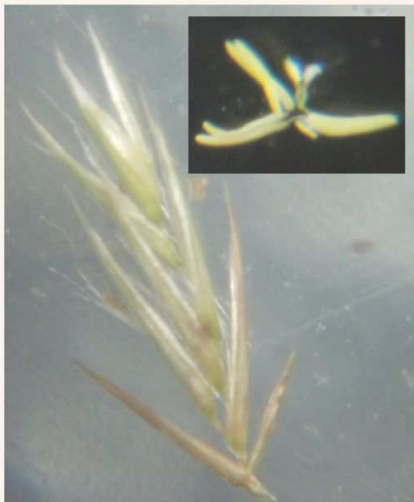


Fig. 8. A spikelet with normal florets



Fig. 9. The separated propagules

topmost floret developed into plantlet and the other florets did not show any development and withered away. Actual floral part from which the plantlets are produced is still under investigation. The systematic position of *Neyraudia reynaudiana* is as given under:

Class: Monocots

Super orders: Commelinids

Order: Poales

Family: Poaceae

Subfamily: Chloridoideae

Genus: *Neyraudia*

Species: *reynaudiana* (Kunth) Keng ex A.S.Hitchc.

Though, this species is not exploited for crop improvement programme in sugarcane, the pseudo-vivipary can be of high value to the sugarcane breeders. In sugarcane the high cost of cultivation is partly contributed by the cost of planting material. In this context, if the gene for this trait can be introgressed to sugarcane, thousands of asexually propagated planting materials can be generated. The propagules (Fig. 9) will be true to the mother plant, as it is asexually produced. Earlier reports of rare occurrence of

transformed lower portion of inflorescence into vegetative structure in Co 421 and artificial induction of vivipary in *S. spontaneum* indicate the feasibility of the expression of this trait in *Saccharum*. As some of the flowers produce normal sexual parts the introgression of this trait may be possible through conventional breeding. In general the members of the sub-family Chloridoideae, to which this genus belongs, is also known for its tolerance to drought and high saline conditions that will also be of interest to sugarcane breeders for developing climate resilient varieties.

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SUGARCANE INBREDS WITH RED ROT RESISTANCE AND HIGH SUCROSE CONTENT

Inbreeding in sugarcane helps in fixing genes of desirable loci to transmit the traits of interest to the progenies with certainty and to have true breeding progeny. The present work was carried out in order to assess the potential of inbreds of sugarcane clones Co 1148 and Co 7201 for their sucrose content and resistance to different isolates of red rot pathogen *viz.*, *cf* 671 (tropical) and *Cf*64 (subtropical) during 2011-12.

In order to identify the potential inbreds having resistance against red rot pathogen 50 inbreds were tested against *cf* 671 isolate by controlled condition testing (CCT) method and were classified into resistant (R) moderately resistant (MR), moderately susceptible (MS), susceptible (S) and highly susceptible (HS). Among the tested clones, nine were found to show HS and S reactions. Remaining 41 inbreds including nine first generation selfs (S_1), three S_2 of Co 7201 and nine S_1 and 20 S_2 inbreds of Co 1148 were evaluated further along with their parents for the sucrose content and their level of resistance against the sub-tropical isolate *cf*64 of the red rot pathogen.

Three inbreds of Co 7201 and seven inbreds of Co 1148 recorded more than 18% sucrose in juice

which were found to be significantly superior to their parent. Reaction of the inbreds to the subtropical isolate in comparison to the tropical isolate of red rot is depicted in Fig. 10. Relatively less number of resistant inbreds was obtained with respect to subtropical isolate. The subtropical isolate *cf* 64 is more virulent than the tropical isolate *cf*671.

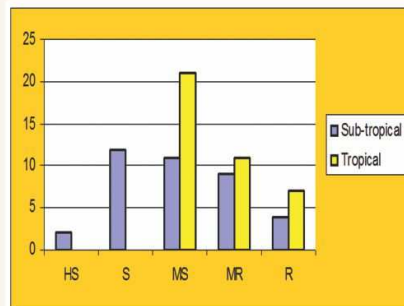


Fig. 10. Comparative reaction of inbreds to the tropical and sub-tropical isolates

Eight inbreds *viz.*, 7201-145, 7201-153-1, 1148-13-11-2-250, 1148-13-11-2-251, 1148- S_2 -242-1, 1148- S_2 -242-5, 1148- S_1 -242-13 and 1148- S_1 -242-3 were found to have resistance against both the isolates. Among the resistant types, 1148-13-11-2-251 and 1148- S_2 -242-13 were with more than 20 % sucrose content. These inbreds may serve as potential parents in improving sucrose content and red rot resistance in sugarcane.

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Training programmes

Short term programmes

Two five day training programmes on 'Sugarcane production technologies' sponsored by EID Parry (India) Ltd was conducted for 26 cane staff during 21-25 August 2012 (Fig. 11) and 11-15 September 2012 for 30 cane staff of EID Parry (India) Ltd (Fig.12).



Fig. 11. Participants of the training programme



Fig. 12. Participants of the course

One day training programmes

Five one day training programs, four for cane development personnel and one for cane growers were organized as detailed below:

Nineteen cane development officers from Sakthi Sugars Ltd. Cuttack on 25 June 2012.

Eighteen cane development officers from Sakthi Sugars Ltd. Cuttack on 2 July 2012.

Eighteen cane development officers from Sakthi Sugars Ltd. Cuttack on 9 July 2012.

Eighteen cane development officers from Sakthi Sugars Ltd. Cuttack on 16 July 2012.

Eighty two progressive cane growers from Sagar Sugars and Allied Chemicals Ltd, Chittoor district, Andhra Pradesh on 14 August 2012.

Participation in exhibitions: The institute participated in the 2nd International Agri-Horti Tech 2012 conducted by Trade India Fairs & Exhibitions Pvt. Ltd. at Coimbatore during 5-8 July 2012 (Fig. 13). A stall was put up depicting the package of practices for cane cultivation in tropical states of the country. Specimens of new sugarcane varieties, bud chip seedlings, tissue culture plants,



Fig. 13. A view of SBI stall

value added jaggery, liquid jaggery, particle boards etc were displayed. Extension pamphlets were also distributed to the visitors.

Hindi Day

Hindi Day was celebrated in the institute on 17th September 2012. Shri. Ananthnarayan Nanda, Post Master General, R.S. Puram, Coimbatore was the Chief Guest. Competitions were held for the different categories of staff and prizes were distributed to the winners (Fig. 14). An official language guide "Rajbasha Margdharsika" was released during Hindi Day (Fig. 15).



Fig. 14. Hindi Day celebration



Fig. 15. Release of 'Rajbasha Margdharsika' by Shri. Ananthnarayan Nanda

Hindi Workshop

The third Hindi workshop of the year was conducted on 29 September 2012. The Chief Guest was Shri. G. Kannadasan, Assistant Director (Official Language) & Member Secretary, Town Official Language Implementation Committee. He spoke on the 'Use of Hindi for official communication' and stressed the importance of spoken Hindi (Fig. 16).



Fig. 16. Hindi workshop in progress

Scientific participation

- Dr N. Vijayan Nair, Director attended the 'Knowledge Meet' with Vice Chancellors of CAU/SAU and Directors of ICAR Institutes at NASC Complex, New Delhi during 21-22 August 2012.

Visits abroad

- Dr P. Murali, Scientist, Agrl. Economics participated in the 28th International Triennial Conference of Agricultural Economists (The Global Bio-Economy) during 18-24 August 2012 at Brazil organized by the International Association of Agricultural Economists.

Meetings organized

- Official Language Implementation Committee meeting on 04 July 2012.
- Grievance Committee meeting during 10 July 2012, 10 August 2012 & 8 September 2012.
- 14th Institute Technology Management Committee meeting on 11 July 2012.

- Senior Officer's Committee meeting during 3 July 2012, 31 July 2012 & 30 August 2012.
- 11th Institute Bio-Safety Committee meeting on 3 August 2012.
- Institute Joint Staff Council meeting on 10 August 2012.
- Institute Management Committee meeting on 21 September 2012.

Awards/Recognitions

- Dr B. Parameswari, Scientist (Plant Pathology) was admitted as a Fellow of Society for Applied Biotechnology on 20 July 2012 in recognition of her contribution in the field of Agricultural Biotechnology.
- Drs. S. Subramanian, P. Rakkiyappan, S. Chinnaraj and S.V. Subramanyam received Shreyans Industries Limited 3rd Best Paper Award for the paper entitled, 'Evaluation of *Erianthus arundinaceus* as a source of non-conventional raw material for pulping and paper making' during IPPTA Zonal Seminar held at Chandigarh on 19-20 July 2012.

Distinguished visitors

- Dr. Charan Das Mahant, Hon'ble Minister of State (Agri & FPI), Government of India visited the Institute on 25 August 2012 (Fig. 17).



Fig. 17. Dr. Charan Das Mahant, Hon'ble Minister of State (Agri & FPI) visiting institute museum

Appointments

Ms. Priyanka Gupta appointed to the post of Assistant at SBI-RC, Karnal on 1 August 2012.

Dr M. Punithavalli, Scientist (Entomology) transferred from Directorate of Soybean Research, Indore on 8 August 2012.

Promotion

Shri M. Kannaian, Skilled Support Staff promoted as T-1 Technical Assistant on 21 September 2012.

Retirement

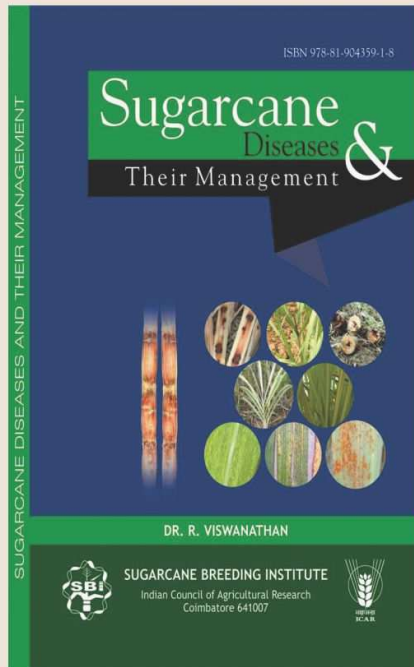
Shri S. Natarajan, T-5 Technical Officer retired from service on superannuation on 31 July 2012.

Shri R. Balraj, T-2 Technical Assistant retired from service on superannuation on 31 August 2012.

Sugarcane Diseases and their Management

Dr. R. Viswanathan, Head, Division of Crop Protection
Price in India: Rs 250/-; Foreign countries US\$25
ISBN 978-81-904359-1-8

NEW
BOOK



The earlier publication, “*Handbook on Sugarcane Diseases and their Management*” published during 2008 from the Institute received good patronage from sugarcane research and development workers and sugar industry personnel in the country. But the disease scenario has changed in different regions and incidence of new diseases has been reported from many places impacting sugarcane production and productivity. Since there is an urgent need for a new book on sugarcane diseases taking into consideration the current disease scenario and new management opportunities a book on “**Sugarcane Diseases and their Management**” has been prepared with colour illustrations. Detailed information on the symptoms of red rot, smut, wilt, yellow leaf disease (YLD), pokkah boeng, leaf scald, mosaic, leaf freckle and other diseases are included in the book. In addition, new information has been provided on the impact of diseases like wilt, YLD, pokkah boeng, rust, leaf scald, virus elimination and disease diagnosis for the benefit of extension personnel. The book provides detailed information on sugarcane diseases in the country and it would also serve as a ready reference to identify the diseases of sugarcane and take up appropriate disease management practices.

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