Valoriser la ressource canne

eRcane

www.ercane.re

Developing sugarcane resources

eRcane Research Centre has a pivotal role in the sugarcane sector in Réunion while being at the forefront of genetic and technological progress with a view to boosting sugarcane production and ensuring its economic viability and sustainability.

Since its inception, eRcane has been producing new high-yielding sugarcane varieties through an experimental breeding programme that prioritizes criteria that will ensure the sustainability of growers' income: upholding high performance during successive ratoons, focusing on diseases resistance, etc.

New expertise has gradually emerged in both the Agronomy and Industry branches.

eRcane is renowned in many other sugarcane producing countries for its core areas of excellence. eRcane provides technical support in these countries and exports Réunion agronomic and industrial know-how.

Elite Réunion varieties are also tested abroad and some are grown at commercial scale, particularly R570 and R579, two local varieties that are currently used in many countries.

90 YEARS OF SUGARCANE EXPERTISE

1920

Early 1900s

Sugarcane production was in a dire situation and the entire sugar industry was in danger of disappearing.

Sugar production: 2 t/ha.

1929

The Sugar Manufacturers' Union created the **LA BRETAGNE SUGARCANE TESTING AND GENETIC RESEARCH CENTRE:**

- importation of resistant sugarcane varieties
- sugar production rebounded spectacularly.

1950

1974

The La Bretagne Centre became the CERF Research and Training Centre.

1970s

Sugar production increased to 7 t/ha

A sugar mill support activity focused on industrial automation.

1978

R570

KEY FIGURES

90
collaborators

200
ha devoted to sugarcane variety trials carried out in **7** breeding stations and in the La Bretagne introduction and hybridization glasshouses

2019
sugarcane varieties catalogued for Réunion growers

+25 partner countries

7
breeding sites managed in partnership in Africa: Cameroon, Chad, Congo, Ivory Coast and Senegal

Benchmark sugar analysis, green chemistry and automation laboratories

2 divisions

AGRONOMY

The Agronomy branch includes the Plant Breeding department and the Cropping Techniques department.

INDUSTRY

The Industry branch is focused on the optimisation of sugar processing while developing research on industrial enhancements such as applying the green chemistry concept.

4 departments

Plant Breeding (1929)

- Hybridization
- Selection
- Genetics
- Variety dissemination

Cropping Techniques (2007)

- Weed control / Herbicide network
- Fertilization
- Tillage / Mechanization

Industrial Automation and Electronics (1973)

- Digital systems
- Digital laboratory and training

Industrial Processing and Innovation (1985)

- Industrial performance
- Sugarcane technological quality
- Sugar laboratory

Biorefinery (2006)

- Green chemistry

1980

Mid-1980s
Creation of a network of 5 decentralized breeding stations.

1985
Sugar producers requested high-performance analytical resources and a sugar processing support department.

2010

2007 : Creation of a technical cropping departement.

2008 : Opening of the Menciol breeding station.

2009 : 80 years, a new identity: eRcane.
Opening of Le Gol breeding station.

2016 : Applied genetics programme (CIRAD partnership).

2020 : First organic sugarcane cropping experiments.

2006 R581 et R582 · 2008 R583 · 2009 R584 · 2010 R585 · 2013 R586 · 2016 R587

Tomorrow

Continue developing sugarcane resources

Plant Breeding

The Réunion Plant Breeding programme was launched in 1929 with the aim of creating sugarcane varieties adapted to the island's contrasted agroclimatic conditions. The breeding process involves two main steps: hybridization and selection.

Hybridization

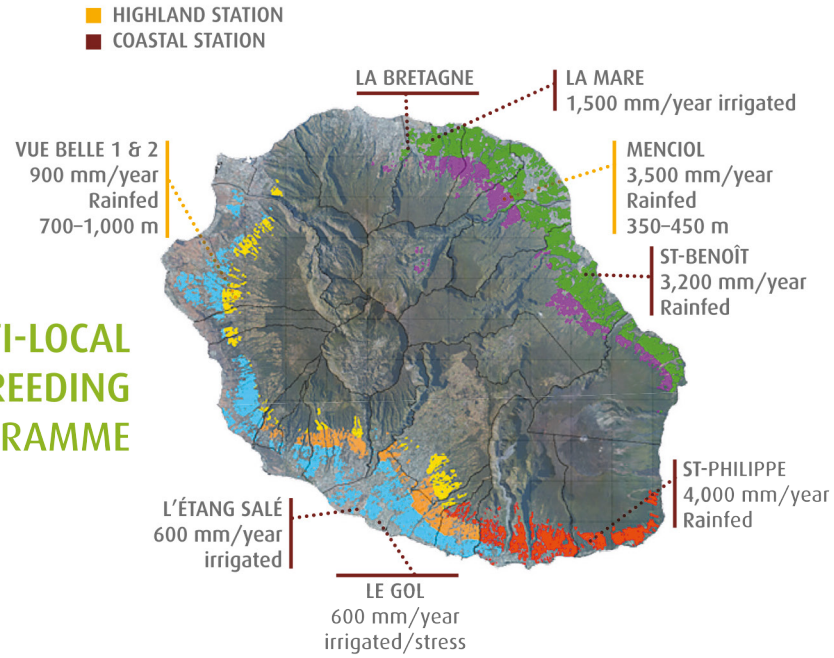
The hybridization process generates genetic diversity via crossing of flowers from our sugarcane germplasm collection containing 1,000 genitors. This collection is characterized by high agronomic performance with regard to tonnage and cane sugar content, as well as resistance to certain pathogens. We thus perform targeted crosses combining these different traits and specific to each eRcane breeding station.

2,500 crosses are performed yearly, leading to the creation of 100,000 new plantlets to serve in our selection scheme.

Genetics

eRcane conducts genetic research with the aim of developing tools to optimise management of its varietal selection and breeding scheme. These genetic analyses involve mathematical modelling approaches (assessment of variability and genetic progress, correction of spatial heterogeneity in trials to improve the experimental accuracy) and/or molecular marker assessment of plant genomes. eRcane also carries out molecular marker studies of genes of agronomic value and tests genomic selection models in collaboration with the CIRAD AGAP research unit.

MULTI-LOCAL BREEDING PROGRAMME



Selection

The selection process highlights the best varieties adapted to the different sugarcane growing areas in Réunion. eRcane is striving to meet the needs of Réunion farmers through a major experimental scheme, consisting of seven sugarcane breeding stations located in the island's different sugarcane growing areas under various conditions: coastal, highland, dry, wet, irrigated, etc. Nearly 200 ha are devoted to variety trials. The main selection criteria are productivity (cane yield, sugar and fibre content), sugarcane disease resistance, ratooning ability, and some key qualitative features (habit, tillering, stem diameter, flowering). A dozen varieties are currently recommended to Réunion farmers depending on their cropping zone.

Cropping Techniques

The Cropping Techniques department, founded in 2007, has gradually broadened its scope of activities by studying several research and development themes, in research stations and mainly on sugarcane growers' farms, to offer them environment-friendly, sustainable and cost-effective cropping practices.

THEMES COVERED

Weed control with the certification of new herbicides, supplemented by tests on their combinations. Alternative methods are also being tested based on mechanical weed control, mulch management, sugarcane varieties, use of service plants, thermal weeding (hot water vapour), as well as micromechanization.

Minimum tillage in sugarcane plantations to reduce costs and erosion risks, while promoting field renewal dynamics. This is supplemented by the mechanization of certain practices

Organic sugarcane: sugarcane cropping using organic production strategies is currently being tested.

Use of Mafor (waste-derived fertilizer materials) from agroindustrial activities, or green waste, as an alternative to imported chemical fertilizer to foster the circular economy and limit the dependence on imported products.

Optimization of chemical sugarcane fertilization, in collaboration with the CTICS (Sugarcane Interprofessional Technical Centre) Agricultural Research team, through tests on new fertilizer products and application methods.

eRcane coordinates the **Rita Canne (Innovation and Agricultural Transfer Network)** with development partners in the sugar sector. Through this network, sugarcane growers are pivotal actors in the innovation research system and technical messages are thereby transferred to them via different tools: demonstration plots, workshops, technical factsheets, etc.

RITA CANNE RÉUNION

Industrial Processing and Innovation

The eRcane Industrial Processing and Innovation Department, founded in 1985, is focused on enhancing sugar recovery processes and optimizing the energy balance in sugar mills.

A team of engineers and technicians is involved at all levels of the process and conducts research and development programmes for the sugar sector.

Training sessions are regularly organized by eRcane for sugar mill staff on different stages of the sugar processing chain (extraction, clarification, evaporation, crystallization) or to fulfil specific requests.

ÉMILE HUGOT LABORATORY

afaq ISO 9001 Qualité AFNOR CERTIFICATION

The Emile Hugot laboratory—essential for the optimization of sugar processing—has qualified staff and all the analytical equipment necessary for analysing sugar industry products. The laboratory, which was granted ISO 9001 certification in 2019, serves as a reference for the two sugar mills in Réunion, while working in collaboration with the International Commission for Uniform Methods of Sugar Analysis (ICUMSA).

BIOREFINERY

Another innovation aspect is the search for new market outlets for sugarcane alongside current ones. Sugarcane is an ideal crop for the biorefinery process. In addition to producing sugar (a food outlet), it also generates electricity via bagasse, organic amendments with filter cake, and alcohol with molasses. Hence, just like crude oil which is broken down into many products (fuel, plastics, chemicals, etc.), biorefineries use processes to separate the various plant components. New pathways are thus constantly being studied to tap the full potential of sugarcane.

Industrial Automation and Electronics Department

The eRcane Industrial Automation and Electronics Department, founded in 1973, has contributed to many sugar processing automation projects in the sugar sector. It installs and maintains distributed control systems (DCS).

This service has a laboratory equipped with a testing and programme simulation station. It provides tailored training for sugar, distillery and power plant staff in Réunion and in any countries that request its expertise.

The proposed services encompass all projects, from feasibility studies to the programming and implementation of control loops, including pre-installation operator training.

Specific transmitters are also developed at eRcane (Donnelly chute level transmitters, conductivity probes, etc.)

eRcane abroad

eRcane's expertise in different fields is recognised in many sugar-producing countries worldwide.

PROVISION OF ELITE SUGARCANE VARIETIES BREEDING SCHEME SET UP

Contracts have been signed with around 20 countries for the provision of elite sugarcane varieties. Every year 5–10 varieties are sent to these partners for testing and the best are then grown on a commercial scale. For instance, R579 is a benchmark variety in Senegal, Ivory Coast, Tanzania, Malawi, Zambia and Guadeloupe.

eRcane has established long-term partnerships in five African countries to support sugar companies in the development of their own sugarcane breeding systems using fuzz—this represents 7 breeding environments overall (Cameroon, Chad, Congo, Senegal, and 3 in Ivory Coast). Every year, crosses targeted to meet the specific growing conditions of each site generate fuzz for the breeding programmes. Varieties created via these collaborations are co-obtained cultivars.

AN INTERCALIBRATION NETWORK

It is essential that data the laboratory supplies to a sugar mill is reliable. The Industrial Processing and Innovation Department set up an intercalibration network with the participation of partner laboratories to validate analytical results so as to ensure continuous improvement. This also provides an opportunity to propose improvements and monitor the laboratory's performance.

Around 20 laboratories in the French overseas departments (DOM) and Africa (Cameroon, Congo, Gabon, Chad, Ivory Coast, Senegal and Tanzania) regularly participate in this permanent performance control process.

Analysis services on all sugar industry products and co-products are also offered.

EXPERT MISSIONS AND TRAINING ON DEMAND

eRcane teams are regularly called upon for expert missions abroad to deal with agricultural and industrial issues.

eRcane offers tailored training courses to meet its partners' specific needs. These training sessions may be held on their partners' sites, in eRcane's premises or in the field (sugar mills, experimental plots) in Réunion.

These training and missions are focused on eRcane's fields of expertise:

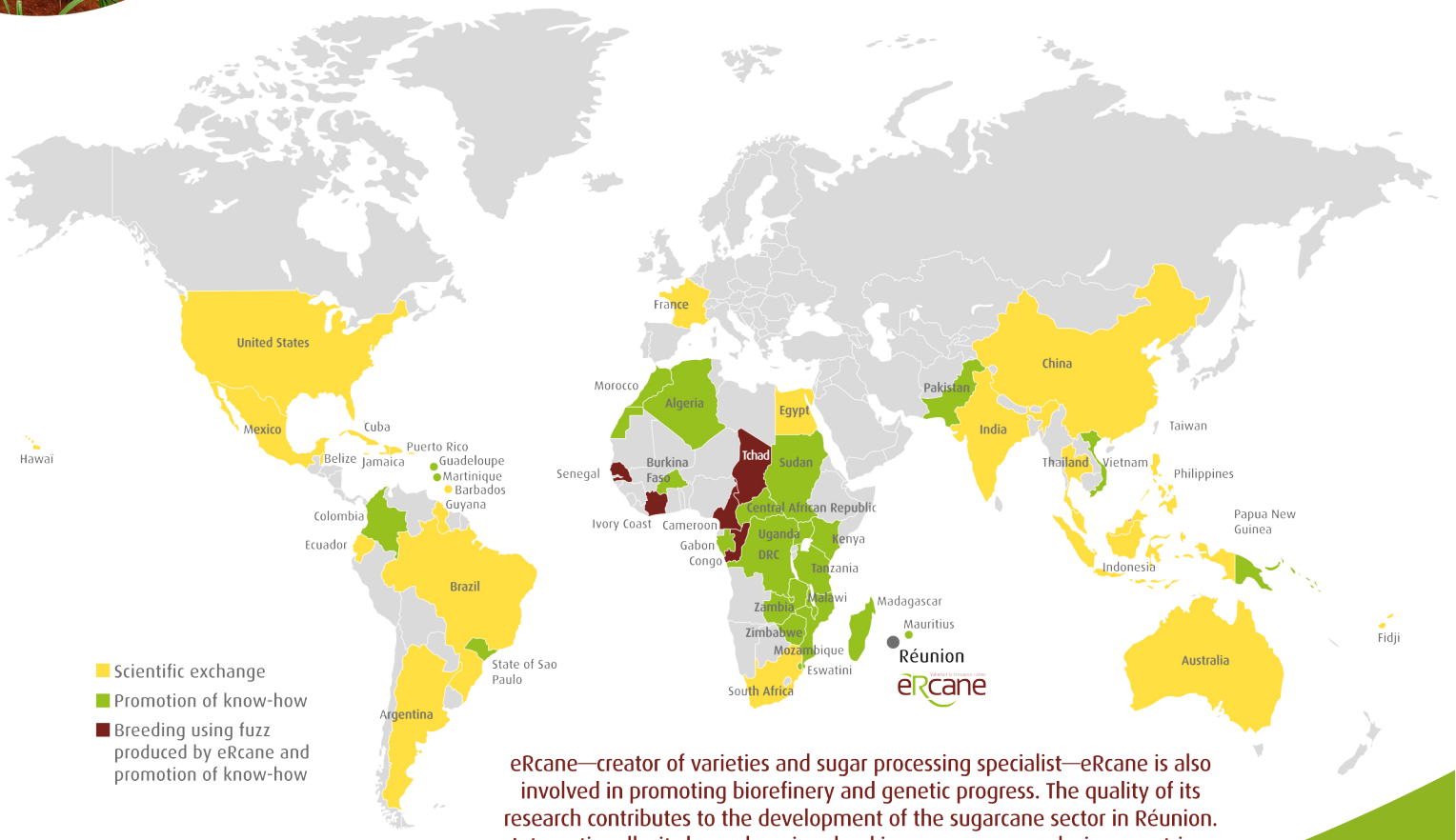
- Agronomy: plant breeding (set up and assessment of breeding schemes), optimization of sugarcane agricultural techniques, agroecology, etc.

- Industry: audit of sugar mill laboratories, sugar analyses, sugar processing, automation, etc.

SCIENTIFIC PROMOTION OF REUNION KNOW-HOW

The work carried out by eRcane is the focus of scientific exchange through collaborations between research teams and participation in seminars and conferences. Moreover, the results obtained are published in specialized scientific journals.

Know-how recognized and exported to many countries.



eRcane—creator of varieties and sugar processing specialist—eRcane is also involved in promoting biorefinery and genetic progress. The quality of its research contributes to the development of the sugarcane sector in Réunion. Internationally, its know-how is valued in many sugar-producing countries.

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eRcane

Département de la Réunion

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