Conserved coconut germplasm from

Vanuatu

Genebank	Contact
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Vanuatu, formerly called New Hebrides, is an archipelago located in Southwest Pacific Ocean, between the Solomon Islands and Fiji Islands. It consists of some 80 widely dispersed islands between the Torres Group (13° South) to the uninhabited Matthew and Hunter islets (22° South). As in most of Pacific island countries, coconut is widely used by rural populations for food and for numerous domestic purposes. The production of copra started in the 1870s and was the mainstay of Vanuatu economy during the 20th century. Coconut is grown over an estimated area of 119,000 ha (census 2007) which represents nearly 60% of the cultivated area. Even if its importance has decreased, copra remains the most important commodity of the country with about 30,000 metric tons of copra exported every year, half of this copra being crushed locally into oil.

On the southeast coast of the island of Espiritu Santo, near the village of Saraoutou (167°12E, 15°27S), a coconut research station was established in 1962. Up to 2001, the station was managed by the Institut de recherches pour les huiles et oléagineux (IRHO), a French research organization merged in 1985 into the Centre de coopération internationale en recherche agronomique pour le développement (CIRAD). In 2002, the coconut research station was integrated into the Vanuatu Agricultural Research and Training Centre (VARTC), the national organization for agricultural research.

VARTC coconut genebank covers a surface area of about 55 ha. This field genebank comprises the exotic cultivars collection with 13 Tall and 13 Dwarf varieties and the local cultivars collection with 1 Dwarf (Vanuatu Red Dwarf) and 20 populations of Vanuatu Tall. It is regularly maintained and rejuvenated by hand pollination every 15 years or more frequently in case of cyclones. VARTC coconut genebank is remarkable by the diversity of origins of the coconut varieties introduced from different countries of Africa, America, Asia and Pacific. The diversity of its Vanuatu Tall populations, of which some were collected during the CGRNAP-COGENT project between 1998 and 2000, is unique in the world.

References

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Vanuatu Red Dwarf (VRD)

Labouisse JP, Sileye T, Bourdeix R.

Conservation

The Vanuatu Red Dwarf (VRD) is only conserved in Vanuatu at the VARTC genebank with 132 palms.

History

Vanuatu Red Dwarf is the only Dwarf identified in Vanuatu. A population of VRD was collected in 1973 on Malo, a small island of 180 km² located to the south of Espiritu Santo (15°40'S, 167°10'E), in the plantation of a French planter. There is no evidence that this cultivar originated from Vanuatu as there are very few populations that can be found in the villages. According to some unpublished documentation, it was introduced from Samoa at the beginning of the 20th century by a Melanesian worker returning from that country. The analysis with molecular markers (microsatellites) showed that it is genetically close to Talasea Red Dwarf of Papua New Guinea even if it differs in morphological characters.

Identification

The Vanuatu Red Dwarf has a rather thin stem and no bole. The leaves are yellowish. Each bunch bears numerous and oblong small-sized bright orange fruits weighting 500-750g. At the VARTC genebank, the fruit component analysis gives the following results: fruit 692 g, husk 162g, shell 137g, water 133g and meat 261g. The copra content is around 117g. The kernel contains a lot of water while the oil content is low (60% of dry matter). The shell is very thick and the husk relatively thin. Unlike Tahiti Red Dwarf, the husk is not pink when immature.

Yield and production

The VRD has one of the lowest germination speed compared to other Dwarfs. In Vanuatu, the germination of VRD starts 70 days after sowing compared to only 30 days for Malayan Yellow Dwarf (MYD). The VRD bears the first flower 26 months after planting (21 months for MYD) and 50% of the palm has flowers after 32 months (25 months for MYD). At the VARTC genebank, the annual number of nuts is over 100 and the yield is around 12 kg of copra per palm per year.

Other information

The Vanuatu Red Dwarf is well adapted to the ecology of Vanuatu and is highly tolerant to Coconut Foliar Decay (CFD), an endemic viral disease transmitted by the insect *Myndus taffini,* even though some slight symptoms have occasionally been observed. It is tolerant to strong winds, when compared to other Dwarfs. At VARTC, in 1999, cyclone Dani toppled only 4% of the VRD palms, as opposed to 100% of the Malayan Yellow Dwarfs.

Due to the small size of the fruit, VRD is never used for making copra or coconut milk. With its numerous bright orange nuts, Vanuatu Red Dwarf is used in Vanuatu as an ornamental tree in parks and gardens. VRD was crossed with Vanuatu Tall in order to obtain a Dwarf x Tall hybrid tolerant to CFD. In experimental trials at VARTC, the hybrid exhibited the following characteristics: resistance to CFD; 154g copra per nut; 145 nuts per palm per year and 3.4 t of copra per ha per year. This hybrid was produced in the 1980s in seed gardens and disseminated to farmers. But the low rate of germination, the small size of the nuts and some problems of adaptation in farmers' fields resulted in stopping the production of this hybrid in the early 1990s.

Reference

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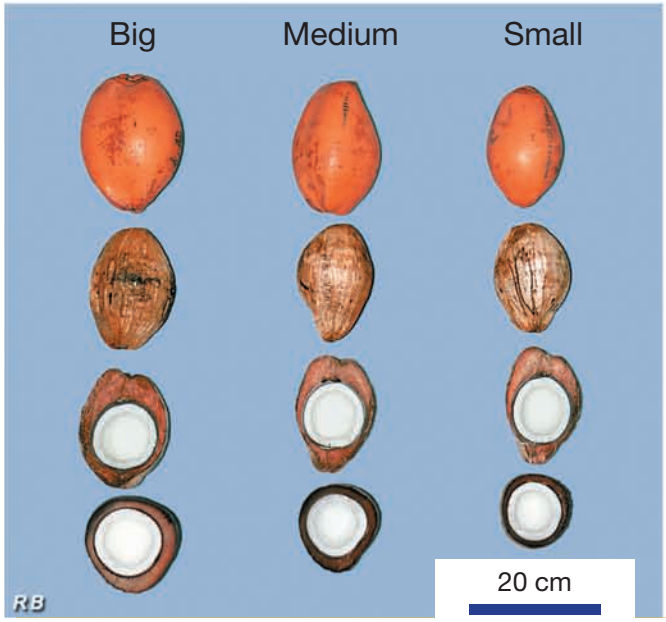
Vanuatu Red Dwarf (VRD)



Vanuatu Tall (VTT)

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Conservation

Nine Vanuatu Tall (VTT) accessions with 787 living palms are spread over 6 countries. The VVT was introduced into Côte d'Ivoire and Jamaica from Vanuatu around 1960, and was then reproduced and sent from Côte d'Ivoire to Brazil, Ghana, the Philippines and Tanzania. This cultivar came from the Leroux estate, not far from the Saraoutou Research Station on the island of Espiritu Santo. More recently, a project implemented throughout the island group led to the collection of around 20 new populations from different islands.

History

Once known as the New Hebrides, Vanuatu is located in the Pacific, southwest of the Solomon Islands and northwest of New Caledonia. It is a chain of around 80 islands and islets extending over 850 km. Coconut palms have been shown to exist in Vanuatu for at least 5000 years (2000 years before the first known sites of human occupation). The coconut groves underwent substantial extension at the beginning of the 20th century. Although the crop is in decline, copra and coconut oil were still the country's main export in 2001.

Identification

The Vanuatu Tall is a heterogeneous population, especially in terms of vertical growth and fruit morphology. The stem is slender but broadens at the base. It bears numerous small fruits, weighing 750-900g, depending on growing conditions. They are slightly oblong and rarely round. The nut, under a usually thin husk, ranges in shape from round, to broader than long, or the opposite. It weighs from 500-650g depending on the site and usually contains thick meat that gives from 140-200g of copra. Nut germination is very rapid, taking only three months on the average.

Tall type coconut palms that produce fruits as small as those of the VTT are rare, apart from the Indo-African varieties. Compared to the latter, the fruits of the VTT are not so oval; seen from above, their cross-section is clearly less triangular. Dry VTT fruits often retain a smooth, regular epidermis, which is very different from the wrinkled appearance of many other varieties.

Yield and production

The Vanuatu Tall starts bearing very early and can flower three years after planting, although it usually takes four to five years. Adult palms produce between 60 and 100 fruits per palm per year under suitable conditions. In Brazil, on poor sandy soil which dries out quickly, annual production has never exceeded ten fruits per palm.

Other information

Until 1965, nobody suspected the existence of a serious coconut disease in Vanuatu. The disease was discovered only when exotic varieties were imported. All the new varieties imported from overseas started to die. Called 'Foliar Decay', the disease is caused by a virus. Only the Vanuatu Tall is resistant to this disease, which has remained confined in the archipelago. This situation has necessitated quarantine measures forbidding the export of planting material from Vanuatu to other coconut growing countries. Research was carried out and now several varieties with Foliar Decay tolerance are proposed: the improved VTT, the Vanuatu Red Dwarf x VTT hybrid and the VTT x Rennell Tall hybrid. The VTT has also performed well with respect to types of Lethal Yellowing that are widespread in Ghana.

References

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