Figure 1. Pineapple plants grown under maize in sandy soil; leaf length ranges from 50 - 75 cm.
Figure 2. Nine month-old pineapple under banana in clay soil. Plants were protected from frost but growth was slow.
Figure 3. Ferti-irrigation treatment, which promoted vegetative growth of pineapple in desert conditions.

Flowering trails were conducted in the Tropical Fruit Department, HRI, to induce plants into flowering. Unfortunately, plants produced a small fruit with big crown. While more than 80 % of the plants produced fruits, others were insensitive to the forcing treatment. Further studies are needed to determine what factors affect forced induction of flowering. Future objectives include getting satisfactory vegetative growth of plants and to determine the best size for forcing. With regard to forcing, the optimum date(s) of forcing must be determined as well. ◆

News From France

CIRAD Pineapple Breeding Program

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'Smooth Cayenne' x 'Manzana' hybrids were created by the CIRAD pineapple breeding program in the nineties. Some of these hybrids have been released to farmers in the French West Indies. Flhoran 41 and Flhoran 53 proved to have solid fruit qualities for both fresh market and processing. Nevertheless, to meet needs of producers and consumers as well as to conform to new regulations regarding environment preservation and limiting the use of pesticides, pineapple breeding was relaunched at the CIRAD research centre in Martinique in 2004. This new effort will build upon one of the world's largest pineapple genebanks. The general objective is to produce new hybrids for the local and export markets. The specific objectives are to improve the storage behaviour, vigour and tolerance of pineapple hybrids to nematodes through direct hybridisation of Flhoran hybrids.

A large breeding campaign begun in 2004 gave rise to more than twenty thousand hybrid seedlings issued from Flhoran hybrids. The first progenies were placed in the field in the winter of 2004-2005 and are now at the harvest stage. Despite the fact that the hybrids are not expected to express their best qualities in the first cycle, the first results are very encouraging. Most plants are highly vigorous with a strong root system and several among the very first fruits harvested have inherited the good fruit qualities of the parents. These good qualities include size, sugar and acid content, colour and firmness of the flesh, reflecting the good combining abilities of the chosen parental pairs. Selection within the progenies will be continued in 2007 and over the successive crop cycle. The best performing hybrids will be multiplied for further evaluation and selection. Meanwhile, methods for early screening for nematode tolerance and internal browning resistance will be developed.

In collaboration with the Institut de recherche pour le développement (IRD), an original method has been developed to test the plant behaviour versus nematodes. Pineapple plants are grown in tubs filled with soil infested with nematodes (test) or without nematodes (control) for six months in the greenhouse. Roots and plant development and nematode infection are measured during

and at the end of the assay. Tests conducted on varieties known to be susceptible or tolerant to nematodes proved the reliability of the method. We will search for nematode-tolerant hybrids among the ones selected for their general agronomic performance and fruit qualities using this newly developed method.

Ongoing research also is aims at understanding the mechanisms leading to post-harvest internal browning (IB) induced by cold during fruit storage. The induction of polyphenoloxydase activities in response to cold storage is measured within leaves and fruits and correlations are searched for. A specific objective is to identify molecular probes for susceptibility to IB that could be used as an early selection tool within hybrid progenies.

CIRAD Pineapple Genebank Database Online

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As a result of years of collection and germplasm exchange, and of an EU-funded project in which institutions from Brazil, France and Venezuela collaborated, CIRAD has gathered hundreds of pineapple cultivars and species of the genus *Ananas* and a wide collection of over 600 accessions has been established in Martinique, FWI, at the CIRAD research centre. This collection includes a wide range of genotypes from many geographic origins, and is presently the most diverse in existence. All accessions in the genebank have been evaluated using common methods for the characterization and evaluation of pineapple germplasm. As a tool to promote information exchange and germplasm utilisation, CIRAD developed a database built on a standardised format. However, the database and its valuable information were not easily accessible to anyone. The development of a joint CIRAD-INRA (Institut National de la Recherche Agronomique) project to build a Tropical Plants Biological Resources Centre (CRB) of the French West Indies made it possible to develop a web portal and give open access to the database directly on the internet. This website makes it possible to get information on cultivated plants conserved by CIRAD and INRA in Guadeloupe and Martinique: sugarcane, bananas, yam, perennial fruit crops, flowers and pineapple. Eventually, the portal will be trilingual: French, English and Spanish. The Tropical Plants Biological Resources Centre of the French West Indies portal is currently accessible though not all features have been implemented. Access to the portal is at http://collections.antilles.inra.fr/BRCPortal/initHome.do.

Ethephon on Pineapple: News About Uses and Regulation

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Introduction

The use of ethephon in pineapple was proposed in the 1970s by CIRAD agronomists in Martinique and Côte d'Ivoire to reduce the time between the harvest of early ripe fruits and the harvest of the late ripe fruits in a pineapple field and to get a more homogeneous external colour of the fruits (Audinay, 1970; Poignant, 1971). Ethephon does not actually colour the fruit, it rather degreens the shell of the fruit by destruction of chlorophyll. The closer the fruit is to natural ripening, the more efficient is the degreening. If correctly applied at the right time, ethephon treatment does not reduce significantly the internal quality of the fruit. This technique drastically changed the management of the harvest because formerly the desired tonnage was harvested from many fields whereas with ethephon degreening the same tonnage could be obtained from only few fields. Few drawbacks to ethephon degreening have been identified as long as the application follows the recommendations (2 – 3 L ha^{-1} when ~1% of fruits begin to colour naturally). One drawback is that sometimes fruits are relatively insensitive to the treatment, for example when high levels of nitrogen have been applied during vegetative growth. This has generally a consequence, the farmer applies higher doses of ethephon, earlier (as many as 3 to 4 weeks before natural ripening sometimes). The result is fruit with poor quality, with a shorter shelf life, withered crowns after cold storage and fruit more sensitive to Internal Browning. With the development of new varieties and also the general evolution of customer sensitivity to the use of pesticides in agriculture, one could expect some changes in the use of ethephon.