für Aparecida

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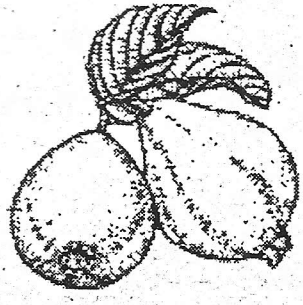

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EVALUATION OF THE DIVERSITY OF CUPUAÇU (*THEOBROMA GRANDIFLORUM* (WILLD. EX SPRENG.) SCHUM.) CONSIDERING THE POTENTIAL USE OF THE SEEDS - EVALUIERUNG DER GENETISCHEN VIELFALT VON CUPUAÇU (*THEOBROMA GRANDIFLORUM* (WILLD. EX SPRENG.) SCHUM.) HINSICHTLICH DER POTENTIELLEN SAMENNUTZUNG

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The Cupuaçu-tree (*Theobroma grandiflorum* (WILLD. EX SPRENG.) SCHUM.) can be found as natural constituent of the terra-firme rain forest of the south-east of Pará, brazil, where it reaches a maximal height of about 20 m with a (trichasiate) ramification concentrated at the top. Cupuaçu-trees cultivated in the plain sun or lightly shaded exhibit a diminution of the longitudinal growth favouring the intensity of ramification which leads to the formation of a more voluminous crown with a storeyed habitus.

The morphological characteristics of the fruits, which have a weight of 1-2 kg and reach a length of 12-25 cm and a diameter of 10-15 cm, are quite similar to those of cocoa (*Theobroma cacao* L.): the pod, a capsular berry, consists of a lignified husk encasing 20-45 seeds which are surrounded by an aromatic pulp, which constitutes about 35-45% of the fruit's fresh weight. According to the appearance of the fruits three types of Cupuaçu-plants have been classified: Cupuaçu redondo, with more spherical, lateral slightly flattened fruits - the rife form Cupuaçu; Cupuaçu mamorana, with more elongated and large fruits - the form with the biggest and heaviest fruits; Cupuaçu mamau, which was found to have no developed seeds. The pulp of Cupuaçu-fruits is commercialized for the production of juice, ice-cream, and other fresh products. Some attempts dealing with the utilisation of the seeds, which amount to 15-20% of the fruit's fresh weight, revealed that in principle a chocolate like aroma can be obtained if the seeds are processed following the pattern for the processing of cocoa seeds.

Primary selected Cupuaçu-plants covering a wide range of variation can be found throughout the Amazon basin mainly cultivated as parts of orchards or small scale production systems. Due to the comparatively stable and high market value of the pulp (2-5 US$ per kg) the cultivation of Cupuaçu recently becomes more and more attractive. Thus, there is a strong demand for the eva-luation of the diversity of the species *Theobroma grandiflorum* in order to define parameters for the selection and breeding of planting material ensuring a reliable quality standard of production. In addition to the criteria dealing with agricultural aspects and pulp production it is suggested to evaluate also the potential use of the seeds for the production of a chocolate-like product.

The following fruit and seed characteristics of Cupuaçu-plants of a polyculture experimental site and of the germplasm at the EMBRAPA/CPAA in Manaus, Brazil, have been recorded:

fruit form; fruit dimensions; fruit volume; percentage of exocarp, pulp, placental tissue, testa, and embryos; number of seeds with and without embryos; thickness of the exocarp; thickness width, and length of the seeds; micro-morphology of the testa.

The biochemical potential to obtain a cocoa-like aroma is being evaluated by analysis of the storage proteins and proteolytic enzymes of the cotyledons.

The obtained morphometric data sets have been analysed by evaluating the variability of the respective properties within a single fruit (seed characteristics), between the fruits of one plant, and between different plants.

Beside a description of the variability of the fruit and seed characteristics the results revealed that the form and dimension of the seeds seem to be mainly maternally defined: 1. the seed qualities differ significantly between individual plants while there are no significant differences between the seeds of fruits of the same plant; 2. comparing fruits of a single plant the variation range of seed qualities is more or less constant. These observations are important considering that the degree of heterogeneity of the seeds (one prerequisite for the processing towards a chocolate-like product of good quality is the uniformity of seeds) seems to be mainly maternally affected.