

I. INTRODUCTION AND OBJECTIVES

“Ninguna plantación, ningún cultivo moderno presenta tantos puntos oscuros o fuertemente discutidos, como el de la *yerba mate*”¹

The *yerba mate-Ilex paraguariensis St. Hil*, - better known in Europe as “*Paraguayan tea*”, “*Jesuits’ tea*” or “*Misiones’ tea*”-, is the only species of *Ilex* that has been used as a stimulant by the Amerindians and has reached importance as a cultivated crop. Year after year, the consumption of *Mate* has turned into a tradition in some countries of South America. *Mate* is consumed in countries as diverse as Uruguay, the land with the highest per capita consumption of *Mate* in the world, Argentina, - where the well-known custom of “*mateadas of the gauchos*” at the beginning of the day are famous -, Brazil, - that made “*chimarrao*” worldly known -, and finally Paraguay, homeland of the always welcome “*tereré*” or cold *Mate* at siesta time.

Several European authors have reported about this species, highlighting the systematic and the pharmacological-stimulating properties as well as the tradition of the way of drinking it. But unfortunately, there are not many investigations written by non-South American authors about the growing requirements of this *Ilex* species. As a result, the selection and growing techniques of *yerba mate* are not well-known throughout the world.

The first people who devoted themselves to the growing and commercialisation of *yerba mate* were the Jesuit Missionaries who succeeded in planting it. Even though they had to go over the problems of germination and production of the plants around the XVIIth and XVIIIth centuries. The expulsion of the Jesuits brought with it the loss of the growing techniques that were used until then. The new plantations that were established in Argentina and Paraguay between the years 1893-1903 marked the start of the modern activity which has survived up to the present day.

The history of the selection of *yerba mate* is full of isolated trials without continuity. Therefore, two of the essential backgrounds of an improvement program are

¹ Dr. Moisés Santiago Bertoni, (1857 to 1929) researcher and wise-man of the Alto Paraná region of Misiones and Paraguay. Cited by Sprecher von Bernegg (1936)

only fulfilled partially: on the one hand, the interchange of information through teamwork and, on the other hand, the continuity in time. The first selection programmes in different areas of the Argentine region, where *yerba mate* is grown, took place in E.E.A. Cerro Azul from INTA in the mid 70's, where, eighteen comparative trials have been installed in total from 1974 up to 1996. Not until the beginning of the 90's, the improvement program of the *yerba mate* started to take place in Brazil. All the efforts of the improvement programs either in Brazil or Argentina are being concentrated only on the green mass production.

Up to this moment, none of the *yerba mate* breeders have analysed the possibility to improve the product's quality. Moreover, the quality parameters to be improved are actually not well defined by the industry. However, in Argentina, the growing of *yerba mate* has always been regulated somehow by the different economic plans of the successive governments. As a result, the productivity and quality have not always been rewarded as it should have been in a free economy. These economic laws have already been changed and the industry will have to make an extra effort to improve its productivity and the quality of the product itself.

In 1941, there were -according to official data – 8000 *yerba mate* producers in Argentina with about 65000 ha of *yerba mate* established plantations. After the colonization politics from the different governments, nowadays near 21000 producers are making their living out of the *yerba mate*, with about 194000 ha of established *yerba mate* plantations. Nowadays, it is considered that only in Argentina, the *yerba mate* business represents about 400 millions of US dollars per year.

Due mainly to the oversupply of the raw material, many producers will have to stop producing *yerba mate*, and base their income in another product or crop. This situation is caused mainly by the fall of the prices and also by the greater quality requirements of a market which is more and more demanding. Furthermore, due to the globalisation, the *Mate* product will have to compete internationally with other substitute stimulant beverages as tea, *guaraná* or coffee.

Apart from competing in its own market, the *yerba mate* will have to compete by means of a grater adaptability with other products in order to win non-traditional *Mate* markets. This challenge will only be fulfilled with a pack of measures to be seriously taken and which would involve all sectors of the *Mate* productive chain, from the industry to the producers, who will have to count with new cultivation and harvest techniques

which could allow them to be more efficient and with new genetic materials adaptable to the always changing demands. The surest way of reaching this step, is by means of better technology, such as improved genetic materials, more efficient plantation, cultivation and harvest techniques, development of new *Mate* products, etc.

In general, when the quality of *yerba mate* is at stake, everybody wants to know what is exactly understood by quality. That is to say that first of all, the quality has to be determined regarding *yerba mate* so as to be able to either reward or penalise it.

The objective of this investigation was not to determine the quality of the *yerba mate*, but rather to start a genetic improvement program for quality in the *Mate* crop. Using quality improvement of the *yerba mate* as a main objective, a selection program was initiated in 1999 among a group of producers supported by INTA Cerro Azul and the University of Bonn, Germany, with the following objectives:

- a) The identification and study of new measured parameters in the fields and in the laboratory related to the quality and the production.
- b) The selection in five representative populations of the productive region of Argentina, and in the selected population from INTA of superior plants by means of mass selection in order to improve the quality of the *yerba mate*.
- c) The determination of some of the genetic control parameters in the field and in the laboratory, which could be related to the quality of the *yerba mate*.
- d) Early Selection in the nursery from the siblings of the mass selected trees and the estimation of some of the genetic control parameters from the different selecting parameters used in the nursery.