

**Summary of a PhD presented to obtain the Scientific Degree in Agricultural Sciences
at the Agrarian University of Havana**

**RATOON STUNTING DISEASE OF SUGARCANE (*Leifsonia xyli* subsp. *xyli*):
IMPROVEMENT OF THE DIAGNOSTIC AND EVALUATION OF THE
VARIETAL RESISTANCE**

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February 2006*

Ratoon Stunting Disease (RSD) diagnostic in sugar cane is difficult due to the little specificity of its symptoms and the fastidious nature of the phyto bacteria (*Leifsonia xyli* subsp. *xyli* Davis) which produces it. On the other hand, the search of the effective methods for the evaluation of the varietal resistance to Ratoon Stunting Disease (RSD) in sugarcane is of major interest nowadays. Thus, there is a need of validated procedures of diagnostic and evaluation of the variety behavior. With the employment of traditional and advanced technologies, a specific antiserum of high title was obtained and different immunochemical and molecular techniques were validated and compared for the detection of *L. xyli* subsp. *xyli*. The efficacy of all the methods evaluated was superior to 95%, standing out the parameters of Dot-Blot estimated between 90% and 96% and the detection limit of 10^3 CFU/mL. The molecular techniques [nested PCR (nPCR) and non-radioactive nucleic acid hybridization (nr-NAH)] were estimated between 94-100% and there was a diagnostic sensitivity of 2 CFU/mL. Additionally, the simultaneous diagnostic of ratoon stunting and leaf scald diseases of sugar cane *Xanthomonas albilineans* (Ashby) Dowson was established for the first time in Cuba by means of nr-NAH, with a 99% effectiveness. In order to determine the relationship existent between the functional bundles and the evidence of *L. xyli* subsp. *xyli* presence in stalks of different sugarcane varieties with well-known behaviour against ratoon stunting disease, the Tissue Blot Enzyme Immunoassay method was used. In this sense, the varieties that presented a more severe bacterial colonization had also higher percentages of non-functional bundles. There was a high correspondence ($R^2 = 0.92$) which allowed to affirm that there was a close relationship among the non-functionality of the xylem bundles, the presence of *L. xyli* subsp. *xyli* and the disease. The relationship existent between the percentage of functional bundles and the varietal reaction was determined by the staining transpiration methods (STM). There was a statistically proved evaluation scale of the variety behavior with 96.4 percent of good. It is a practical approach to this matter that can be helpful for the National Genetic Improvement Program.