

WATER DEPTH INFLUENCES ON DEVELOPMENT OF BANANA CLONES (*Musa spp.*) AND THE NEMATODE INTERACTION IN RESISTANCE EVALUATION TO *Meloidogyne javanica*.

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INTRODUCTION

Brazil holds second place world-wide as a banana producer and this is one of the most popular fruits in the country. Unfortunately, many diseases occur in this crop, affecting all parts of the plant. One of the most important plant parasitic nematodes in banana is *Radopholus similis*, but considerable attention has been directed to the root-knot nematode (RKN) *Meloidogyne spp.*. Phytonematodes of the genera *Meloidogyne* have been found in banana production areas, especially *M. incognita* and *M. javanica*. These species have occurred more frequently with considerable economic damages and each year the lost increases. The damages caused by RKN are proportional to their population sizes, fertility and soil type. The plants suffer height reduction, weight loss, maturation delay and even death.

OBJECTIVES

As little is known about banana crop resistance to this nematode, the aims of this work were: (1) to study the reactions of different banana clones to *M. javanica*, under greenhouse conditions; (2) to check the effect of different irrigation levels in the development of infected plants.

MATERIAL AND METHODS

Banana clones were obtained from "Companhia de Promoção Agrícola" (CAMPO).

The irrigation system was established before the seedlings plantation and put to work before inoculation began (Figures 1). They were planted in 5L plastic bag with sterilised soil and kept under temperature varying from 24 to 29°C (Figures 2).

The nematodes were extracted by association of the techniques: Trituration, Sieving, Baermann Funnel (for soil) and Centrifugation (for roots) and nematode inoculation were made immediately after extraction, on the root region of banana clones.

Three randomised pots per clone were harvested 3 months following inoculation. At this time the aerial parts and roots were weighed before extracting. The nematode extraction was the same previously mentioned. The nematode number in each replicate was determined for all banana clones.

The analysis of banana resistance was based on reproduction rate and on % of inhibition of *Meloidogyne javanica*, based on Taylor, A.L. & Sasser, J.N. Int. *Meloidogyne* Proj., NCSU Graph. NC, USA, 1979. 111pp.

Figure 1a. Water Depth System of Banana Assay versus *Meloidogyne javanica*; b. Válvula solenóide.



Figure 2. Banana Clones Inoculated with *Meloidogyne javanica* after three months inoculation

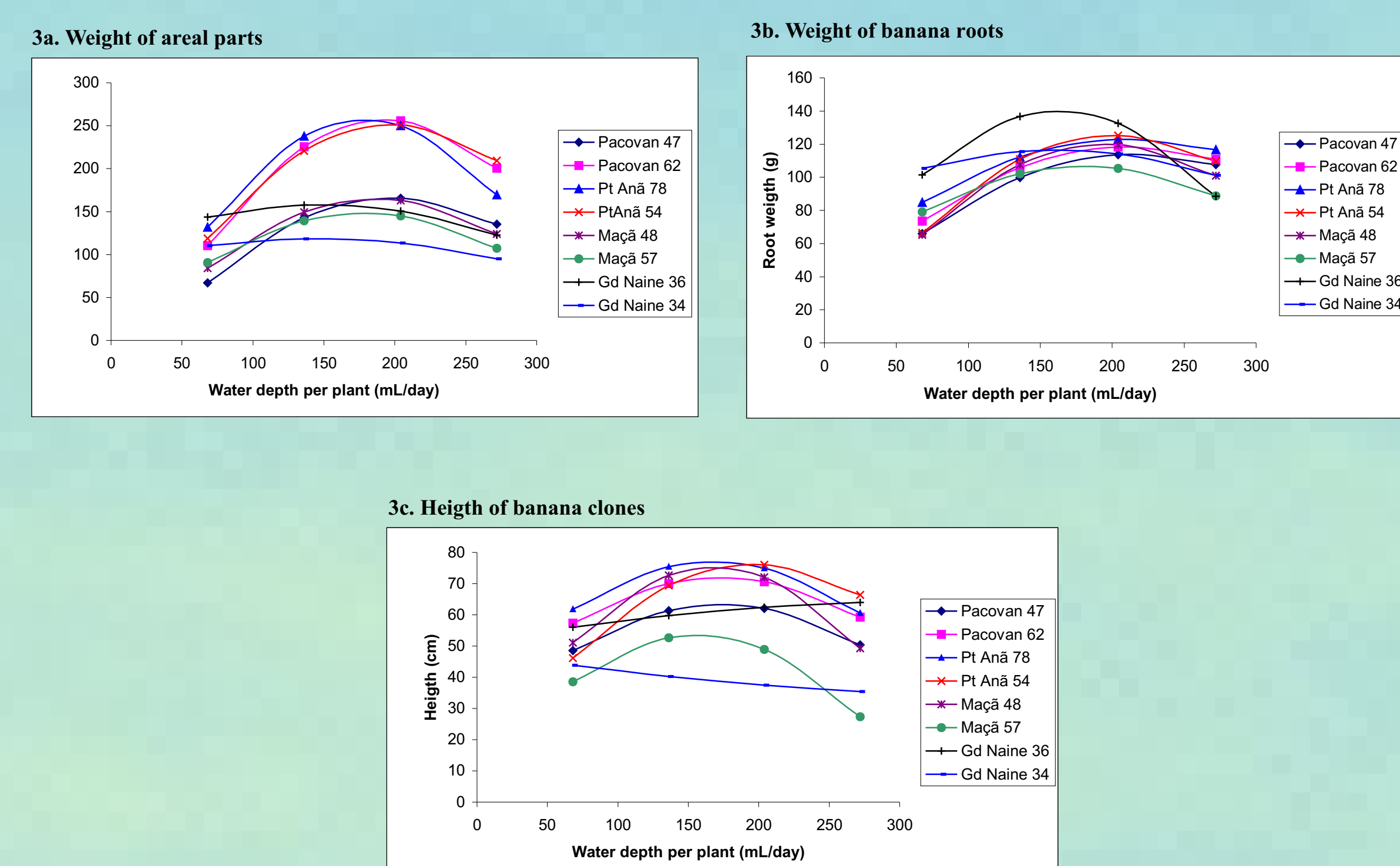


Table 1. Results of Banana Resistant Clones to *Meloidogyne javanica* and the Effect of Water Depth on the Parasitism.

| Variety | Genome | Water Level | | | |
|-----------------|--------|-------------|-----------|-----------|-----------|
| | | 68mL/day | 136mL/day | 204mL/day | 272mL/day |
| PACOVAN 47 | AAB | MR | MR | MR | MR |
| PACOVAN 62 | AAB | R | MR | MR | MR |
| PRATA ANÃ 78 | AAB | R | R | MR | MR |
| PRATA ANÃ 54 | AAB | R | R | LR | MR |
| MAÇÃ 48 | AAB | MR | R | PR | MR |
| MAÇÃ 57 | AAB | R | R | MR | HS |
| GRANDE NAINE 36 | AAA | R | MR | S | PR |
| GRANDE NAINE 34 | AAA | R | MR | S | HS |

MAÇÃ 57: Standard
RESISTANCE TYPE: (HS) Highly Susceptible; (S) Susceptible; (LR) Lower Resistant; (MR) Moderately Resistant; (R) Resistant.

Figure 3. Results of Four Different Water Depth in Development of Banana Clones Inoculated with *Meloidogyne javanica*



RESULTS

The results from this work are in Table 1, which shows the reaction of banana clones to the nematode *Meloidogyne javanica*. Due to the biggest reproduction rate, "Maçã 57" variety is considered the standard. "Grande Naine 34" variety followed the standard with 2.3, for the 272ml of water/plant/day, for both varieties. For 204ml/day/plant, only "Grande Naine 36" and "Grande Naine 34" showed reproduction rates superior to one, respectively 1.9 and 1.4 fold times. All reproduction rates were inferior to one, in the other water depths studied.

For 68, 204 and 272ml of water there were no statistical difference for root weight, among the 8-banana varieties and clones studied. However, for 136 ml/plant/day there was significant difference ($p < 5\%$) between "Pacovan 47" and "Maçã 57" when compared to "Grande Naine 36", for root weight.

The water depth showed significance on plant height for all 8-banana varieties, being the most successful "Prata Anã 78" at 204ml of water. The lowest (68ml) and largest (272ml) level of water showed no significant difference among the varieties, related to the weight of the aerial parts.

The intermediate levels of water (136 and 204ml) showed significant difference among the varieties related to plant height. Therefore, the water depth affected the response of banana varieties to nematode resistance to *M. javanica*.

CONCLUSION

- Resistance reactions to *M. javanica* can be found among the studied banana clones, under greenhouse conditions.
- The influence of the amount of water per day results in differences on the development of infected banana plants.