

Communications

Morphological Characterization of Plant-parasitic Nematodes in *Livistona rotundifolia*

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Received: 13 January 2022; Revised: 21 July 2022; Accepted: 22 October 2022; Published: 22 October 2022

Livistonia rotundifolia also known as ‘table palm’ or ‘fan palm’ is one of the major export foliage plant in Sri Lanka. The exportation has a potential to generate income for the medium scale farmers. The plants are mainly exported at size 25-85cm potted plants to Germany, USA, Japan, China, and Switzerland according to the data reports “Anonymous [1]”. Recently some shipments have been rejected due to infestation with parasitic nematodes at National plant quarantine service, Sri Lanka.

The alterations induced by nematode parasitism cause abnormal growth of plants, nutrient deficiency symptoms, roots with galls, forking, and other deformations which will reduce crop quality. Root knot nematodes are the most common parasitic nematode type that attacks *L.rotundifolia* and causes heavy loss in the industry “Jegathambigai *et al* [6]”. The nematode species are usually identified using morphological features of second-stage juveniles. The nematodes are known as one of the most difficult organisms to identify due to their microscopic size, morphological similarity, a limited number of distinguishable taxonomic characters and due to overlapping Morphometric measurements “Chitwood *et al* [4]”.

In order to investigate the level of contamination of parasitic nematodes the soil samples were taken from the field. Firstly, randomly selected 30 plants of *Livistonia rotundifolia* from main exporters in Northwestern province, Sri Lanka. Three categories of plants were chosen to represent seedlings, medium growth stage and export stage plants. Ten

samples consist of 30g of soil from each category were used for the nematode extraction. Plant nematodes were extracted by using Baerman’s funnel technique, which was carried out at National Plant Quarantine Service, Katunayaka. Larval stages of nematodes were killed and preserved by adding 1%-2% formalin to the final suspension of nematodes, followed by heating the suspension to 55°C -57°C. Nematodes were identified by observing morphological parameter “stylet” in the mouth cavity area “Oliveira et al [7]” using Olympus CX21 optical microscope under ×400 magnification. A biochemical test for Parasitic Nematodes was ideal to conduct in case to prove the level of contamination. Therefore, Nine Pots (15 cm height) were half-filled with steam-treated sandy soil and each pot was top up with field-collected soil of *Livistonia rotundifolia* and three pots used as a control. Three-week old tomato seedling (variety; Thilina) was transplanted and assessed after 19 days .Roots were scored for the degree of galling according to a rating chart described in “Bridge and Page [3] ”, by visual observation, analyzed using ANOVA technique and the mean comparisons were done with Tukey’s test at 0.05% probability using Minitab (2018) statistical software.

Morphologically Plant-parasitic nematodes differ from non-parasitic forms in the possession of a needle shaped structure; stylet in the mouth cavity and in esophageal characteristics. In this study, root-knot nematodes such as *Meloidogyne spp* and *Rotylenchulus reniformis* (Figure 1) were identified.

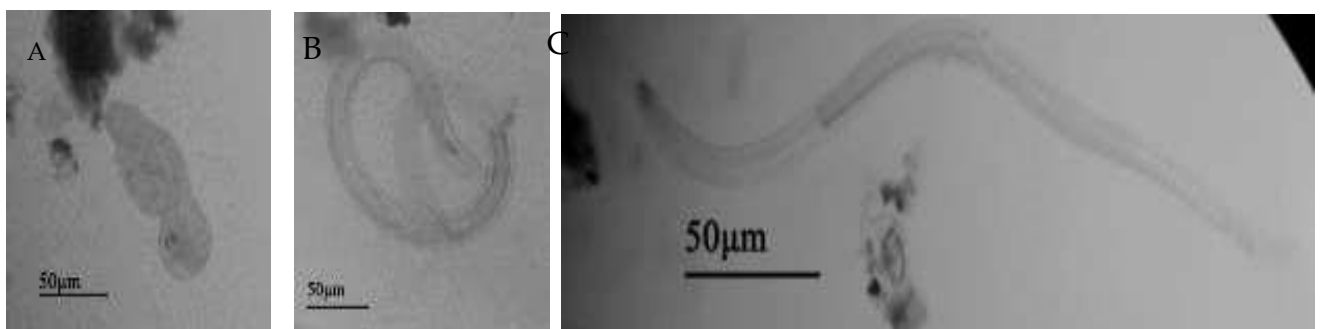


Figure 1. B,C *Meloidogyne spp*, A. *Rotylenchulus reniformis*

The results of the bioassay test indicate the significant difference among the root-knot nematode contamination in three different growth stages of the plant.

Table 1. Root gall index values of tomato bioassay

Control±SE	Nursery stage±SE	Medium stage±SE	Export stage ±SE
2.00±2.65 ^b	15±8.66 ^a	6.67±2.89 ^{ab}	2.33±2.31 ^{ab}

(Between columns, values followed by superscript letters indicate significant difference at p=0.05, SE; standard error)

According to the Tukey simultaneous results the root gall index of medium stage plants and export growth stage plants have no significance but the root gall index of nursery stage plants is significantly higher(15.00) than the control mean(2.00). As the seedling, stage is more susceptible to root knot nematodes; *Meloidogyne spp*, it is recommended to apply fumigation and other necessary treatments to this stage.

Conflicts of Interest

The authors declare no conflicts of interest.

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