v. 3, n. 5, 2023

Journal of Agricultural Sciences Research

IDENTIFICATION OF MELOIDOGYNE JAVANICA NEMATODE AGALLADOR IN BEGONIA CULTIVAR COCKTAIL

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Abstract: This research presents the identification of the species of the Nematodo Agallador MeloidoGyne from stirred roots of Begonia Cultivar Cocktail that grew in greenhouse conditions. The staining of the roots with Agallas The Goodey method was used, then under the stereoscopic microscope the Meloidogyne females were removed from a root fragment. MeloidoGyne females were put on a slide, and with a razor razor their body were cut into two parts to eliminate their cuticle to form a picture that contains the perineal pattern, they were cleaned with 45% lactic acid for 20 seconds and Pure glycerin, Meloidogyne perineal patterns were mounted in transparent lactophenol. In the composite microscope, 20 perineal patterns were observed for its identification of Meloidogyne species, it was compared with specialized morphometric keys to Meloidogyne. The morphological characteristics that were observed in the 20 perineal models correspond to rounded stretch marks in its dorsal part and in its ventral part, lateral lines that divide the dorsal and ventral part that is distinctive characteristic for this species that corresponds to M. Javanica. This research can be considered as a pioneer in identifying the species of Meloidogyne in Begonia in Mexico.
Keywords: Root knot nematode, perineal patterns and begonia.

INTRODUCTION

The Begoniaceae family is widely found in the tropics. The most important genres of this family are: Begonia, Hilbrandia and Symbegonia, with about 1500 species, of which 1000 belong to the genus Begonia. This family is distinguished by its economic importance and from the ornamental point of view, by its show and colorful color of its leaves, also by the great fondness for the cultivation and care of these plants (Jiménez and Schaubert, 1997). Medicinal uses of the Begonia, in the markets of Asunción, Paraguay, the plant called "agarial" that belongs to the genus Begonia Cuculata Will, for pharyngitis and stomatitis is marketed. (Basualdo et al 2004).

Begonia cultivation diseases are mainly caudted by fungi: ashrush (oidium begoniae), stem and crown (pythium), by bacteria: foliar spots and bacterial blight (xanthomonas begonias), and foliar nematodes (aphelenchoides fragarias) in the Begonias Elatior Rieger (Larson, 1988). Since the last century there are reports from the Agallador Nematode (Meloidogyne sp.) In the Begonia. In study on the sensitivity to M. Incognita race 3 in several crops with their respective cultivars, including the Begonia, it was observed that cultivar vodka is slightly susceptible, and four cultivars of Begonia were susceptible to the nemádo agaller (Walker, Melin and Davis, 1994).

Nematod problems are more severe when there is a good host or plant and is often grown for a long time. Nematoded damage are unnoticed around all of us, however, performance losses are equal to the damage of other phytopathogens, also the damage is more large when associated with other pathogens (Mai W.f.1985). The Meloidogyne genus, in one of the most studied nematodes in the world, due to its economic importance and its wide range of hosts, their damage vary from 5% when crops are applied nematicides, however, the damage can reach 25% or more when there is no control (Taylor and Saser, 1983).

In the identification of the species of Meloidogyne, 24 species of the Agallador Nematode for the warm climate are cited, and 12 species of this nematoding for cold regions (Taylor and Sasser, 1983). The most common species of Meloidogyne in warm climates are: M. Incognita, M. Javanica and M. Arenaria, and in cold climates the most common species is M. Hapla. It has an excellent

microphotographic description of the four most common species in Meloidogyne, which leaves no doubt for its identification of this nematod, 1983).

With perineal models and molecular analysis of Meloidagyne sp. In the Begonia plant there was no accurate identification at species level, which can be a new species (Solano et al, 2015). At the Begonia plant, M. Javanica and an unidentified species of the Agallador Nematode (Doucet and Pinochet 1992) were reported. The Begonia demonstrated susceptibility to M. incognita by the manifestation of guts both in roots, as in stems and leaves (Shepperson and Jordan, 1968). The purpose of a correct identification of nematodes is basic for efficient control. Nematologists need to make identifications to conduct research, teaching, extension and other activities (MAI, 1985). It is necessary to observe at least 10 or more models to determine the tendency of the species or species of the Agallador Nematode, before demonstrating the species in Thorne Study (1961).

The objective of this research was to identify the Meloidogyne present species (s) in the cultivation of the begonia.

MATERIALS AND METHODS

Roots were collected with the MeloidoGyne Nematode at the Begonia ornate Plant Cultivar Cocktail, in greenhouse conditions in the Academic Unit of Agriculture of the Autonomous University of Nayarit, in 2017.

The wrapped roots were washed with running water, then the roots were placed in a precipitate of 250 ml on an IKA-C-C-Mag H57 brand, for 2 minutes at a temperature of 65 ° C, the staining was made with The Goodey technique, which consists of preparing 20 grams of phenol crystals, 20 cc of lactic acid, 40 cc of glycerin, 20 cc of distilled water and 5 cc of fuchsina acid (1 gram in 100 cc of water) (Figure 1), This mixture remained to the boiling point, followed the roots were washed with running water to remove the water, (Thorne, 1961, Taylor and Netscher, 1974).

Figure 1. Begonia roots with staining according to the Goodey technique.

Meloidogyne females were extracted under a Motic SMZ-11 stereoscopic microscope with the target of 4.5 x, with the help of dissection needles. Once a female was isolated, according to Thorne (1961), a cut was made with a thin razor razor in the back of Meloidogyne, this was made again a cut in the upper and lower part, leaving only the perineal model, this was cleaned according to the technique of Taylor and Netscher (1974) that consists of placing the perineal model on a drop of 45% lactic acid for 20 seconds, with a bamboo splinter the granular material of the nematode that is On the model, followed by the perineal model, it is transfront to a drop of pure glycerin and cleaning with the bamboo splinter is continued, until the model is observed clean. The cut was mounted in a covers with a drop of light lactophenol, Thorne (1961). Approximately in the circle is the perineal model of the female nematode of Meloidogyne (Figure 2).

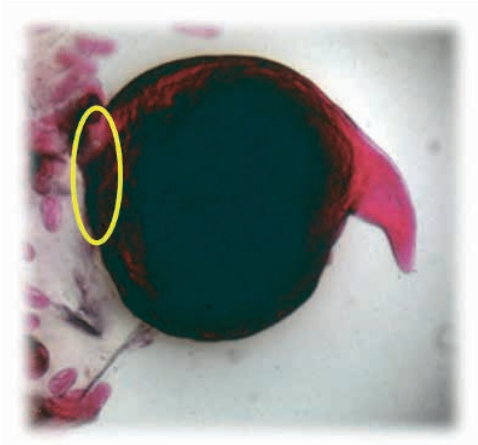

Figure 2. Location of the perineal model in the female of Meloidogyne

The slide was sealed with nail polish, for later observation and identification of Meloidogyne species. In the Motic B1 220-SP compound microscope with the objectives of 40 x and 100 x in immersion oil, 20 assemblies of the Meloidogyne perineal models were analyzed. The characterization of the Meloidogyne species, the shape of the perineal model, presence or absence of: side lines, wings, shoulder wings, stages, which were compared to specialized morphometry keys of the genus Meloidogyne (Eisenback et al 1983, Taylor, and Sasser, 1983).

RESULTS AND DISCUSSION

Of the twenty perineal patterns of Meloidogyne analyzed at the plant of the cultivar begonia. Cocktail, correspond to the species of *Meloidogyne javanica*. The number of perineal patterns observed, the clear characteristic of the species of M. Javanica, which is identified by its dorsal arc in round to flattened, with incisures or well visible lateral lines that divides the perineal model in two regions the dorsal and ventral, few or no line crosses the incisures that give an appearance of a channel. The previous description corresponds to what Eisenback et al, (1983) and Taylor and Sasser, (1983). In figures 3 and 4, two perineal models are shown: *M. javanica*.

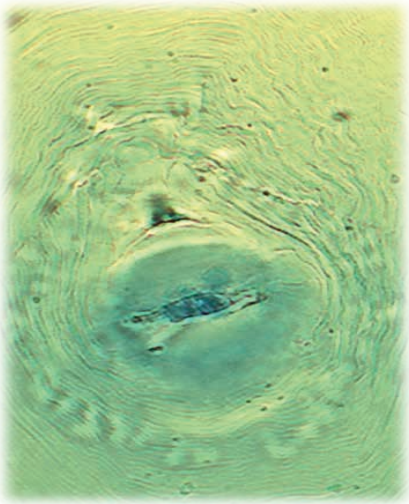

Figure 1. *Meloidogyne javanica* 40X

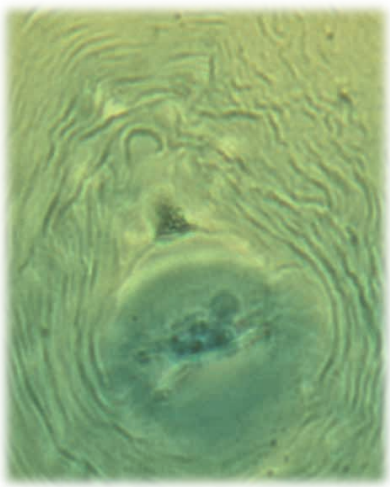

Figure 2. *M. javanica* 100X

In the dissection of the roots of Begonia, a greater number of female nematodes, a lower number of larvae, and an absence of males were observed. The above agrees that the identification in females is more reliable than in males of the Agallador Nematode, because there is more presence of females than of males in the stirred roots Sasser (1954).

The cleaning of perineal models is a bit arduous, since, when observing in the light microscope, a total cleaning of the model is not observed and therefore makes it difficult to identify the species, however, the technique of Taylor and Netscher, (1974) to clean the

perineal cuts of Meloidogyne, it is excellent, because clear perineal models are obtained and no doubt in the characterization of the main species of the Agallador nematode. The identification of Meloidogyne species, by perineal models is accessible to students and researchers from the different universities of the world, because it is an accessible technique and with the use of relatively cheap light and reagents. The identification of Meloidogyne species requires patience and dedication, since perineal models constitute specific reliable characteristics that nematologists in this genus need to become familiar. The identification of Meloidogyne species is not an easy task for the casual observer (Thorne, 1961).

There are few references in Mexico and in the world about the identification of the Agallador Nematode in Begonia. The present work coincides with the investigation by Doucet and Pinochet (1992), which identified Meloidogyne Javanica in Begonia. M. Javanica's world distribution occupies the second of the four most common species with 31% of the populations studied (Eisenback et al, 1983).

The Begonia Cultivar Cocktail plants were introduced to the state of Nayarit of a greenhouse in the State of Mexico, with the purpose of conducting an experiment in the Academic Agriculture Unit, it is worth mentioning that the Begonia is susceptible to the Nematod Jordan (1968). In this experiment, 4% damage to a population of 300 plants was presented, this indicates that the Begonia Cultivar Cocktail is susceptible to the Agallador Nematod Cultivating Cocktail is slightly susceptible to the agaller nematod.

In the present investigation, Meloidogyne Javanica can be considered as a unique species in the plants of the Begonia because no other perineal model of the Agaller Nematoder was observed. However, it must be considered that the diversity of species tends to be reduced in stressed biotic communities, for the competence of other communities and physical and environmental environments (Odum and Barret, 2006).

CONCLUSIONS

The identification of Meloidogyne Javanica in Begonia Cultivar Cocktail, represents a contribution to the nematology of Mexico and in the world for the scarce of information that exists between Meloidogyne Javanica and the Begonia.

This research can be considered in Mexico as one of the pioneers in identification with perineal models of the MeloidoGyne sp. in the cultivation of the begonia.

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