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Occurrence of plant parasitic nematodes associated with Noni (*Morinda citrifolia* L.) intercrop with Coconut

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Noni, *Morinda citrfolia* L., is a medicinal plant cultivated as mixed crop in coconut gardens in coastal regions of Kerala, India. (Khandekar *et al*., 2014). It' s cultivation is severely constrained by plant parasitic nematodes. Among them, root knot nematode (RKN), *Meloidogyne* sp., is key nematode pest cause galls/knots on the roots of noni plants. The plants affected by severe infection showed mortality in the field and decrease in yield. These nematode damage noni roots by penetrating deep into tissues, and through their feeding they cause roots to swell (knots/galls) and crack. Therefore, root knot nematode is a potential threat to noni cultivation.

Hence, random survey in different localities of Noni cultivated as mixed crop under coconut garden in Kasaragod district of Kerala to know the status of nematode incidence on Noni under coconut gardens. Randomly 135 soil and root samples were collected from Noni rhizosphere in zig zag pattern in coconut garden from different locations of Kasaragod District. Soil samples were processed for nematode extraction by Cobb's sieving and decanting method. Nematodes were collected and fixed in hot TAF (Triethelene Amine Formaline) and stored for population analysis. The population of nematodes in each sample was counted three times with the help of Syracuse counting dish under the Leica MS 5 stereoscopic zoom microscope and mean value was worked out. The incidence of RKNs in Kasaragod-1, Kasaragod-2 and Kattukukke localities was 89.6, 65.7 and 11.9%, respectively. The root and soil samples were infested with *M. incognita*. There was significant variability in the prevalence and incidence of *Meloidogyne* sp., between soils and locations in Kasaragod district (Table 1). Disease prevalence is high in Coastal sandy littoral about 89.6 % while Noni grown in Sandy clay loam soil was low incidences about 11.9% where due to unfavourable pore size and aeration which probably resulted in poor nematode multiplication and movement. Highest galling index (5) were recorded in two locations, Kasaragod-1 and Kasaragod-2, whereas minimum galling index (1.0) in Kattukukke. *Morinda* was damaged by *M. incognita* as reported by Kavitha *et al*. (2011) and *M. arenaria* in China (Fu *et al*., 2013). Since, RKN is one of the serious threat to Noni cultivation, suitable management options are important for preventing multiplication of *M. incognita*.

Table 1. The percentage incidence and gall index of RKN

Location	Soils	% incidence	Gall index	Nemat. Popul./ 100 g soil
Kasaragod-1	Costal sandy littoral soils	89.6	5	286.9[a]
Kasaragod-2	Red sandy loam soils	65.7	5	243.6[a]
Katukukke	Sandy clay loam soils	11.9	1.0	71.5[b]

Fig. 1. *Meloidogyne incognita* infested Noni plant showing yellowing of leaves and wilting

Fig. 2. *Meloidogyne incognita* infested Noni root

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Report of *Meloidogyne incognita* infecting Begonia in Assam

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Begonia semperflorens Link & Otto, a perennial ornamental herb belongs to the family Begoniaceae. The Begonias are native to moist subtropical and tropical climates and are commonly grown indoors as ornamental houseplants in cooler climates.

Association of root-knot nematode was noticed in *Begonia semperflorens* plants grown in Biswanth College of Agriculture campus, Biswanath Chariali, Assam. The infestations of roots of plants were very severe and the galls varied in shape and sizes were observed (Fig. 1). The leaves of infected

Fig. 1. Roots of Begonia infested with root-knot nematode

plants become chlorotic. Infestation of root-knot nematode on various crops of Asssam was reported earlier by Neog *et al.* (2015).

Soil and infected roots samples were collected from the area for analysis in the laboratory and nematode juveniles were extracted from 250 cc soil using modified Cobb's sieving and decantation technique then root-knot nematode population were counted, which was recorded to be 280 J_2 / 250cc soil. Ten juveniles of *Meloidogyne* were killed by gentle heating and their temporary slides were prepared to identify the species on the basis of morphological character (Pokharel *et al.*, 2007). Roots were washed carefully in running tap water and examined under a stereoscopic binocular microscope. Different stages of root-knot nematode on the roots were observed.

Five matured adult females were teased out of the roots and posterior region was cut down and perineal pattern were prepared. Microscopic observations reveal that the perineal patterns of all the populations appeared roughly oval with high, squarish, dorsal arch, composed of closely spaced, smooth to wavy striae without forking. Lateral fields were absent. These morphological characters of perineal patterns were compared with the reported literature and were confirmed to be *Meloidogyne incognita*.

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