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Interception of an exotic plant parasitic nematode (*Rotylenchus minutus*) on African potato (*Hypoxis hemerocallidea*) from Swaziland*

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Twenty-one corms of African potato, *Hypoxis hemerocallidea* Fisch, Mey and Lall imported from Swaziland Agricultural Research Centre, Swaziland was received at Division of Plant Quarantine, NBPGR, New Delhi in September 2011 for its quarantine examination. *Rotylenchus minutus* (Sher 1964) Germani *et al*. 1985 was intercepted during the quarantine processing for the first time in India on imported African potato corms. African potato, native to South Africa, also occurs in Botswana, Lesotho and Swaziland, is used for its medicinal properties, in particular to boost the immune system. It is a tuberous perennial with strap-like leaves and yellow star shaped flower. The tuberous root stock or corm (Fig 1) is the part used mostly for its medicinal properties. It is dark brown to black from outside and yellow inside when cut.

The spiral nematode, genus *Rotylenchus* consists of a number of species having significant economic importance in agriculture. They are migratory ectoparasites of roots and navigate on the surface of the roots. *Rotylenchus* spp. are polyphagus, parasitise a wide-range of wild and cultivated plants, including vegetables, tubers, ornamentals, fruits, forest trees etc. (Castillo and Volvas 2005). *Rotylenchus minutus* has been recorded, apart from type locality (Hattah, Victoria, Australia, in uncultivated sandy soil), in several localities of South Africa, Western Cape Province, Olifants River at Mica and Ligthelm Nursery, Middelburg, Transvaal (Van den Berg and Heyns 1973; Van den Berg 1981). Here, this species was intercepted on African potato from Swaziland, during quarantine processing, which is a new host record for *R. minutus* and has not been reported in India, based on literature survey. Corms, after examination, were given dip treatment in 0.2% formalin solution for 15 minutes to eliminate nematodes. Four corms were retained at NBPGR to grow in pots for its post entry quarantine test and rest was released to indenter, which were used for its chemical analysis. Six months later, post entry quarantine inspection was conducted on plants grown at NBPGR to ensure complete elimination of intercepted nematode. For that, soil samples from around the each corm were taken for nematode analysis; all samples were found free from *R. minutus*.

Fig 1 African potato corms imported from Swaziland infected with *Rotylenchus minutus*

All corms (21) were immersed in tap water for an hour in a plastic tub, shaken well and gently rubbed with hand to remove adhering soil clods and debris. Resultant soil-water suspension was used to extract nematodes by Cobb's sieving and decantation and modified Baermann's funnel techniques (Southey 1986). Collected live nematodes were killed in hot water at 60°C for one minute and fixed in 4% formalin. For taxonomic studies part of specimens collected were transferred to glycerine by adopting the method of Seinhorst

*Short note

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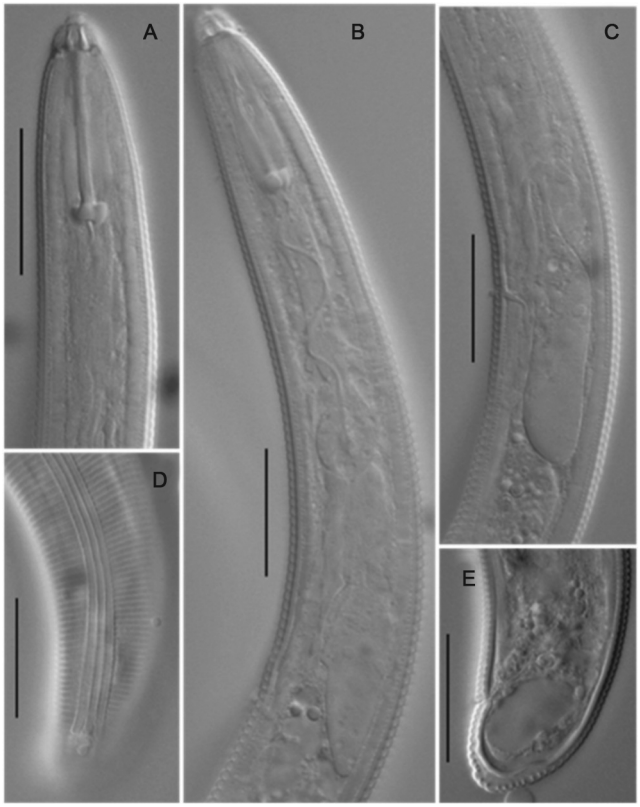

Fig 2 Microphotographs of *Rotylenchus minutus.* A&B- Anterior body region, showing stylet and oesophagus; C- Oesophageal region, showing excretory pore and overlapping of basal glandular part of oesophagus; D- posterior body region showing lateral lines; E- female tail. (Bar=20µm).

(1959) and subsequently mounted on glass slides in anhydrous glycerin. The nematodes were observed under a compound microscope (Axiophot Zeiss, Germany). Measurements were taken using an ocular micrometer and photographs (Fig 2) were taken with digital photo camera (AxioCam HR, Zeisss, Germany) mounted on the microscope. DeMan's formula was used to determine pertinent values of measurements. Intercepted nematodes were identified as *Rotylenchus minutus* with the help of diagnostic key provided by Castillo and Volvas (2005), based on morphological analysis of female specimens.

Female (n=10): L= 613-773 (723.5±64.4)µm; a=22-29 (26.0±2.6); b=4.8-5.9 (5.4±0.8); c= 43-48 (47.8±3.6); c´= 0.8 (0.75±0.2); V=55-63 (57.7±3.6); stylet=26-28 (26.5±0.9)µm; tail= 14-16 (15.0±1.0)µm; ABD= 17-20 (18.7±1.3)µm.

Male: not found

Body slightly ventrally curved to C-shaped. Lateral field 1/5 to 1/4 the body width at midbody, with four incisures areolated in oesophageal region. Lip region angularly hemispherical, slightly set off, 5-6 µm in diameter bearing 3-4 annules. Stylet stout, 24-26 µm long with rounded knobs. Oesophagus Hoplolaimoid type, median bulb 7-8 body annuli long. Excretory pore opposite oesophageal lobe. Hemizonid 2–3 annuli long, its position varying from opposite to 1 annulus anterior to excretory pore. Anterior cephalid 3-4 annuli and posterior cephalid 7-12 annuli from base of lip region. Width of annuli on body about 1.5 µm. Vulval opening a transverse slit. Lateral fields marked with 4 lines, areolated in the oesophageal region. Reproductive system didelphic, amphidelphic. Spermatheca distinct and round. Epiptygma indistinct. Phasmid 1.5-2.5 µm broad, its position varying from 1 annulus anterior to 4 annuli posterior to anus. Tail 14–16 µm long with rounded terminus.

R. minutus is characterized by having lip region continuous with body contour, which is conical to hemispherical in shape and marked with 3–4 annuli. Stylet length less than 30 µm; lateral fields areolated in the oesophageal region; body without longitudinal striations. Vulva equatorial, positioned between 50–60% of body length. Tail short with rounded terminus. The morphological data and characteristics of the present female population of *R. minutus* match well with its original description given by Sher (1964) as well as to those provided by Van der Berg and Heyns (1973). This study highlights the importance of interception of *R. minutus* on a new host in minimizing risk of introducing exotic nematode into the country.

SUMMARY

During the quarantine processing at NBPGR, New Delhi *Rotylenchus minutus* intercepted on corms of African potato, *Hypoxis hemerocallidea*, which were imported from Swaziland. Here, African potato is reported as a new host record for *R. minutus* and this species has not been reported in India. Infected corms were given dip treatment in 0.2% formalin solution for 15 min to eliminate nematode infection. Six months later, post entry quarantine inspection was conducted on corms grown in potted soil at NBPGR, New Delhi. All samples were found free from *R. minutus*. This study highlights the importance of interception of *R. minutus* on a new host in minimizing risk of introducing exotic nematode into country. Moreover, prophylactic treatment of corms with 0.2% formalin assisted in salvaging the material infected with *R. minutes*.

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