Description of Dolichodorus grandaspicatus n. sp. (Nematoda: Dolichodoridae)¹

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Abstract: Dolichodorus grandaspicatus n. sp., collected from soil about roots of a red maple (Acer rubrum L.) in a creek bottom near Ludwig, Johnson County, Arkansas, is described. It differs from two closely related species, D. marylandicus and D. heterocephalus, by the longer spike on the female tail, the length of the female tail, and the shape of the extrudable portion of the gubernaculum of the males. It further differs from D. marylandicus by having heavily sclerotized accessory pieces of the vulva and from D. heterocephalus by having a shorter stylet.

Key words: taxonomy, morphology, new species.


There are 10 described species of Dolichodorus. Lewis and Golden (2) recently published a key to nine of the species with reference to literature pertinent to the genus and to the sub-family Dolichodorinae. Jairajpuri and Rahmani (1) described the species D. kishansinghi, which was not included in the above.

In July 1979 samples were taken from a creek bottom near Ludwig, Johnson County, Arkansas, to find and identify a Dolichodorus species found in the general area by Dr. R. D. Riggs a few years earlier. In one sample a few specimens of an undescribed species of Dolichodorus were recovered. A later sample from about the roots of red maple (Acer rubrum L.) yielded numerous specimens of both sexes as well as second-, third-, and fourth-stage juveniles.

MATERIALS AND METHODS

Specimens were killed and fixed by hot 2% formalin and processed to glycerin by a modified Seinhorst rapid method as described by Robbins (3). Specimens were prepared for SEM observation by gold coating glycerine impregnated specimens using the method of Sher and Bell (4). Observations were made on an ISI-60 SEM.

In the following description, all measurements are given in μm, unless otherwise stated; ratios and counts have no units. Means are given first, followed by the range, standard deviation, and coefficient of variation (as a percentage) in parentheses. Only mean and range given in descriptive text. The specific name is derived from the Latin words granda (large) and spica (spike).

DESCRIPTION

Dolichodorus grandaspicatus n. sp.

MEASUREMENTS (16 ♀ ♂ paratypes):

Length = 2.40 mm (2.15-2.65; 0.17; 7.2); width = 38.1 (33-42; 3.0; 7.9); a = 63.0 (56.1-76.7; 6.2; 9.8); b = 10.1 (9.2-11.0; 0.6; 6.0); c = 27.4 (22.6-34.6; 3.2; 11.6); c' = 2.6 (2.0-3.4; 0.36; 13.5); V = 54.3 (51.4-56.3; 1.4; 2.6); stylet = 89.6 (84-93; 2.7; 3.1); stylet conus = 53.4 (48-60; 4.0; 7.4); distance from anterior end to excretory pore (ex.p.) = 170.2 (152-186; 10.9; 5.9); tail = 88.4 (68-106; 9.6; 10.8).

HOLOTYPE (♀): Length = 2.58 mm; a = 64.6; b = 11.1; c = 31.5; c' = 2.42; V = 54.5; stylet = 90.6; stylet conus = 53.8; distance from base of stylet to dorsal esophageal gland orifice (DGO) = 5.3; distance from anterior end to median bulb valve (MBV) = 141; ex. p. = 171; distance from anterior end to hemizonid (hemizonid) = 191; distance from anterior end to hemizonion (hemizonion) = 216; spike length = 66; annule width = 1.6-1.7.

DESCRIPTION OF FEMALE (paratypes): Body vermiciform, slightly arcuate. Lip region prominent, markedly offset from body (Figs. 1A, 2C), with 5-6 very fine inconspicuous lip annules. Lip region en face with four lobes, a slightly oval oral disc (Fig. 2A), strong cephalic framework, and heavily sclerotized basal plate. Amphids lateral, longitudinal slits. Cephalids as shown (Fig. 1A). Stylet conus 60% of stylet length, stylet knobs rounded, directed pos-

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Fig. 2. SEM pictures of Dolichororus grandaspicatus n. sp. A) Female en face. B) Male tail, dorsal. C) Female, oblique head. D) Female tail, dorsal. E) Female, anus.


teriorly. Excretory pore clearly visible, variable in position, from mid-median bulb to anterior basal bulb. Hemizonid 24.8 (13–36) posterior to excretory pore. Hemizonion inconspicuous, about as far posterior to hemizonid as semizonid is from ex. p. Vulva a transverse slit (Fig. 1C–H), with sclerotized, opposed, accessory pieces observed in lateral view (Fig. 1G). Vagina strongly sclerotized near vulva. Vagina about half the body width. Ovaries amphidelphic, outstretched. Spermapheca oval, conspicuous, at proximal end of oviduct. Cuticle with annules slightly wider at level of excretory pore (≈ 1.8) than at mid-body (≈ 1.5). Lateral field with three lines, completely areolated. Midline starts about two lip widths from anterior end, extends to phasmid, outerlines start in region of median bulb, extend to level of anus. Serpentine canals conspicuous in most specimens. Tail, when viewed laterally, with “shoulders,” tapering to a spike which may be acute or rounded (Figs. IE–F, 2D). Tail, when viewed dorsally or ventrally, without “shoulders,” origin of spike inconspicuous (Figs. 1F, 2D). Most tails end in a small mucor (Figs. 1B–E, G, 2B), others acute to conical rounded. Anus a transverse slit (Fig. 2E). Anal body width 33.8 (30–38).

MEASUREMENTS (18 ♂♂ paratypes):
Length = 2.13 mm (1.88–2.44; 0.14; 6.7); width = 33.8 (27–39; 3.1; 9.1); a = 63.3 (55.9–73.7; 5.0; 7.9); b = 9.3 (8.7–10.6; 0.4; 4.6); c = 70.1 (62.2–81.0; 5.1; 7.3); stylet = 84.8 (78–90; 3.5; 4.1); stylet conus = 50.7 (44–55; 2.8; 5.6); spicules = 40.4 (36–44; 2.1; 5.3); gubernaculum = 23.9 (22–27; 1.3; 5.4); tail = 30.6 (24–34; 2.9; 9.6); ex. p. = 161 (136–190; 13.2; 8.2).
ALLOTYPE (♂): Length = 2.16 mm; a = 59; b = 9.4; c = 83; stylet = 89.7; stylet conus = 53.8; DGO = 4.4; MBV = 133; spicules = 38; gubernaculum = 21.3; tail = 26; ex. p. = 179; hemizonid = 201; annule width = 1.4 (mid-body), 1.8 (median-bulb region).

DESCRIPTION (♂ & ♂): Body similar to female in head shape, annule width, lateral lines (except tail regions); however, slightly smaller with posterior region (20%) markedly more curved than anterior region (80%), and with bifurcate tail terminus. Caudal alae typical for the genus. Testis outstretched. In lateral view, gubernaculum with extrudable, slightly curved distal end that is characteristically hook shaped (Fig. 1J, L); accessory structure interposed with adjacent spicule (Fig. 1J).

JUVENILES (J-2, n = 14; J-3, n = 14; J-4, n = 14), measurements: See Table 1.

DESCRIPTION (J-2, J-3, J-4): Body similar to female in overall shape, head shape. Tails with definite spike, generally with definite mucor at terminal end. Serpentine canals conspicuous in most specimens (Fig. 1B-D).


ALLOTYPE (♂): Same data as holotype. Slide T-355t, USDANC, Beltsville.

PARATYPES (♀♀, ♂♂, juveniles): USDANC, Beltsville, Maryland; California Nematode Survey Collection, Davis; Department of Nematology Collection, Riverside, California; Nematology Department, Rothamsted Experimental Station, Harpenden, Herts., England; Laboratorium Voor Nematologie, Wageningen, The Netherlands; Laboratoire des vers, Museum, 61 Rue de Buffon, Paris, France; Institute voor Dierkunde, Laboratorium voor Morfologie en Systematiek der Dieren, Legegansck, 35, B-9000, Gent, Belgium; Canadian National Collection of Nematodes, Ottawa, Canada; remaining specimens retained in the author's collection.

TYPE HOST AND LOCALITY: Soil from about the roots of red maple (Acer rubrum L.) in a sandy-silt creek bottom with high organic matter, one mile north and one mile east of Ludwig, Johnson County, Arkansas, USA.

DIAGNOSIS: Dolichodorus grandaspicatus n. sp. is more similar to D. marylandicus Lewis & Golden 1981 and D. heterocephalus Cobb 1914 than the other Dolichodorus spp. It differs from both species by the much longer tail and spiked portion of the female tail. It further differs from D. marylandicus females by the narrower body, 38 (33-42) vs. 45.3 (39.2-54.6); “a” ratio, 63.0 (56.1-76.7) vs. 45.5 (36-54); “c” ratio, 27.4 (22.6-34.6) vs. 38.8 (30.2-51.4); and by having a heavily sclerotized structure exterior to the heavily sclerotized distal portion of the vulva. It further differs from D. heterocephalus females by having a shorter stylet 90 (84-93) vs. 99 or more. The males differ from both the above species by the characteristically hook shaped extrudable portion of the gubernaculum.

LITERATURE CITED
Morphological Comparisons Between Xiphinema rivesi Dalmasso and X. americanum Cobb Populations from the Eastern United States

Abstract: Though in the past Xiphinema americanum has been the most commonly reported dagger nematode in the eastern United States, our studies revealed the presence in Pennsylvania of a previously unrecognized and unreported species related to X. americanum. Morphometric data and photomicrographs establish the identity of this form as X. rivesi and show expected variations in populations of this species from various locations. Similar data and illustrations are given for X. americanum populations from Pennsylvania and other areas, showing variations and relationships. Xiphinema rivesi is widely distributed in the fruit producing area of southcentral Pennsylvania and is also reported herein from raspberry in Vermont and apple in Maryland and New York. This species is frequently found in fruit growing areas of Pennsylvania associated with tomato ringspot virus-induced diseases and is also found associated with corn, bluegrass sod, and alfalfa. Key words: Xiphinema americanum, X. rivesi, morphology, occurrence, fruit orchards, virus transmission.

A previously unrecognized, didelphic species of the nematode genus Xiphinema Cobb, 1913 was isolated by the senior author in 1977 from soil in a southcentral Pennsylvania (Adams County) apple orchard. Since the initial isolation, the species has been isolated frequently from peach and apple orchards, grape vineyards, and soft fruit plantings as well as alfalfa, corn, and bluegrass in this particular area of Pennsylvania and from fruit growing areas in nearby states. Many of the sites where this nematode has been found have a history of tomato ringspot virus (TmRSV) problems in the fruit crops. The possible association between this species of Xiphinema and TmRSV disorders is being investigated. Preliminary results indicate that this previously unidentified species of Xiphinema is able to transmit TmRSV (3), and its presence in fruit orchards, alone or in species mixtures, has complicated dagger nematode identifications, especially in virus transmission research. This report primarily provides morphological data and details of the newly isolated Xiphinema species identified herein and the related and commonly occurring species, X. americanum Cobb, 1913.

MATERIALS AND METHODS

Soil samples were taken with an Oakfield soil probe to a depth of approximately 25–30 cm, depending on soil condition and texture. Multiple probes were combined to give a composite sample of approximately 550 cm³. Each composite sample was thoroughly but gently mixed, a 100-cm³ subsample was taken, and the nematodes extracted by a modification of the decanting and sieving technique described by Flegg (2). The extracted nematodes were killed with a 3.4% hot formaldehyde solution, fixed in formalin/acetic acid fixative,