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ADDITION TO THE FAUNA OF PLANT AND SOIL NEMATODES OF GUJARAT, INDIA

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INTRODUCTION

When we started the work about 33 species of phytophagous nematodes have been reported by earlier workers from Gujarat. Keeping in view poor state of knowledge of nematode fauna from Gujarat state, the surveys were planned in the state by authors so that wide gap in our knowledge may be filled up. During 2000-2004 surveys were conducted to 25 districts of Gujarat. About 670 soil samples from 250 localities, from rhizosphere of 40 host plants were collected. These samples yielded wide variety of nematodes. Authors identified 107 species belonging to 49 genera of 20 families under four orders *viz.*, Tylenchida (21 spp.), Aphelenchida (1 sp.), Dorylaimida (77 spp.) and Mononchida (8 spp.).

However Baqri and Bohra (2003); Bohra and Baqri (2004) have already published one new genus and four new species and 78 species as a new records from the state. Our further study adds 13 new records from the state during (2004-2005).

The present paper reports 133 species of plant and soil nematodes species belonging to 60 genera of 27 families under four orders *viz.*, Tylenchida (42 spp.), Aphelenchida (3 sp.), Dorylaimida (80 spp.) and Mononchida (8 spp.) are now known from Gujarat. These species of plant and soil nematodes are listed below according to their systematic position. Species reported for the first time from the state are marked with asterisk (*).

MATERIAL AND METHODS

Nematodes were fixed in hot 4% formalin and mounted in anhydrous glycerine. All the specimens included in the present study have been deposited and registered in National Zoological Collection of Zoological Survey of India, Jodhpur.

NEMATODA

SYSTEMATIC LIST OF NEMATODES FROM GUJARAT

Order TYLENCHIDA Thorne, 1949

Suborder TYLENCHINA Chitwood in Chitwood & Chitwood, 1950

Infraorder TYLENCHATA Siddiqi, 2000

Superfamily TYLENCHOIDEA Orley, 1880

Eamily TYLENCHIDAF Orley, 1880

Subfamily BOLEODORINAE Khan, 1964

Genus *Basiria* Siddiqi, 1959

1. *Basiria brevistylus* (Khera, 1970) Ebsary, 1991
2. *Basiria bilineata* (Saha & Khan, 1982) Ebsary, 1991

Infraorder ANGUINATA Siddiqi, 2000

Superfamily ANGUINOIDEA Nicoll, 1935 (1926)

Family ANGUINIDA Nicoll, 1935 (1926)

Subfamily ANGUININAE Nicoll, 1935 (1926)

Genus *Ditylenchus* Filipjev, 1936

3. *Ditylenchus triformis* Hirschmann & Sasser, 1955

Suborder HOPLOLAIMINA Chizhov & Berezina, 1988

Superfamily HOPLOLAIMOIDEA Filipjev, 1934 (Paramonov, 1967)

Family HOPLOLAIMIDAE Filipjev, 1934 (Wieser, 1953)

Subfamily HOPLOLAIMINAE Filipjev, 1934

Genus *Hoplolaimus* Daday, 1905

4. *Hoplolaimus indicus* Sher, 1963
5. *Hoplolaimus pararobustus* (Schuurmans Stekhoven & Tenuissen, 1938) Sher, 1963

Genus *Scutellonema* Andrassy, 1958

6. *Scutellonema brachyurus* (Steiner, 1938) Andrassy, 1958

Subfamily ROTYLENCHOIDINAE Whitehead, 1958

Genus *Helicotylenchus* Steiner, 1945

7. *Helicotylenchus dihystera* (Cobb, 1893) Sher, 1961
8. *Helicotylenchus anehelicus* Sher, 1966
9. *Helicotylenchus erythrinae* (Zimmermann, 1904) Golden, 1956

10. *Helicotylenchus exallus* Sher, 1966
11. *Helicotylenchus indicus* Siddiqi, 1963
12. *Helicotylenchus multicinctus* (Cobb, 1893) Golden, 1956
13. *Helicotylenchus orthosomaticus* Siddiqi, 1972
14. *Helicotylenchus retusus* Siddiqi & Brown, 1964
15. *Helicotylenchus rotundicauda* Sher, 1966
16. *Helicotylenchus truncatus* Roman, 1965

Family ROTYLENCHULIDAE Husain & Khan, 1967,
Husain, 1976

Subfamily ROTYLENCHULINAE Husain & Khan, 1967

Genus *Rotylenchulus* Linford & Oliveira, 1940

17. *Rotylenchulus reniformis* Linford & Oliveira, 1940

Family PRATYLENCHIDAE Thorne, 1949 (Siddiqi, 1963)

Subfamily PRATYLENCHINAE Thorne, 1949

Genus *Pratylenchus* Filipjev, 1936

18. *Pratylenchus loosi* Loof, 1960
19. *Pratylenchus thornei* Sher & Allen, 1953
20. *Pratylenchus zae* Graham, 1951

Subfamily HIRSCHMANNIELLINAE Fotedar & Handoo, 1978

Genus *Hirschmanniella* Luc & Goodey, 1964

21. *Hirschmanniella gracilis* (de Man, 1880) Luc & Goodey, 1964
22. *Hirschmanniella mucronata* (Das, 1960) Khan, Siddiqi, Khan, Husain & Saxena, 1964
23. *Hirschmanniella oryzae* (van Breda de Haan, 1902) Luc & Goodey, 1964

Subfamily RADOPHOLINAE Allen & Sher, 1967

Genus *Radopholus* Thorne, 1949

24. *Radopholus similis* (Cobb, 1893) Thorne, 1949

Family MELOIDOGYNIDAE Skarbilovich, 1959 (Wouts, 1973)

Subfamily MELOIDOGYNINAE Skarbilovich, 1959

Genus *Meloidogyne* Goeldi, 1892

25. *Meloidogyne arenaria* (Neal, 1889) Chitwood, 1949
26. *Meloidogyne hapla* Chitwood, 1949

27. *Meloidogyne incognita* (Kofoid & White, 1919) Chitwood, 1949
 28. *Meloidogyne javanica* (Treub, 1885) Chitwood, 1949
 29. *Meloidogyne indica* Whitehead, 1968

Family HETERODERIDAE Filipjev & Schuurmans,
 Stekhoven, 1941 (Skarbilovich, 1947)

Subfamily HETERODERINAE Filipjev & Schuurmans,
 Stekhoven, 1941

Genus *Heterodera* Schmidt, 1871

30. *Heterodera cajani* Koshy, 1967
 31. *Heterodera zaeae* Koshy, Swarup & Sethi, 1971

Superfamily DOLICHODOROIDEA Chitwood in Chitwood &
 Chitwood, 1950 (Siddiqi, 1986)

Family TELOTYLENCHIDAE Siddiqi, 1960

Subfamily TELOTYLENCHINAE Siddiqi, 1960

Genus *Telotylenchus* Siddiqi, 1960

32. *Telotylenchus paaloofi* Tikyani & Khera, 1970

Genus *Tylenchorhynchus* Cobb, 1913

33. *Tylenchorhynchus divittatus* Siddiqi, 1961
 34. *Tylenchorhynchus latus* Allen, 1955
 35. *Tylenchorhynchus mashhoodi* Siddiqi & Basir, 1959
 36. *Tylenchorhynchus microcephalus* Siddiqi & Patel, 1990
 37. *Tylenchorhynchus nudus* Allen, 1955

Genus *Bitylenchus* Filipjev, 1934

38. *Bitylenchus brevilineatus* (Williams, 1960) Jairajpuri, 1982
 39. *Bitylenchus vulgaris* (Upadhyay, Swarup & Sethi, 1972), Jairajpuri, 1982

Genus *Scutylenchus* Jairajpuri, 1971

40. *Scutylenchus hexincisus* (Jairajpuri & Baqri, 1968) Siddiqi, 1979

Family PSILENCHIDAE Paramonov, 1967 (Khan, 1969)

Subfamily PSILENCHINAE Paramonov, 1967

Genus *Psilenchus* de Man, 1921

41. *Psilenchus hilarus* Siddiqi, 1963

Suborder HEXATYLINA Siddiqi, 1980

Family PAURODONTIDAE Thorne, 1941 (Massey, 1967)

Subfamily PAURODONTINAE Thorne, 1941

Genus *Paurodontus* Thorne, 1941

42. *Paurodontus similis* Siddiqi, 1961

Order APHELENCHIDA Siddiqi, 1980

Suborder APHELENCHINA Geraert, 1966

Superfamily APHELENCHOIDEA Fuchs, 1937 (Thorne, 1949)

Family APHELENCHIDAE Fuchs, 1937 (Steiner, 1949)

Subfamily APHELENCHINAE Fuchs, 1937

Genus *Aphelenchus* Bastian, 1865

43. *Aphelenchus avenae* Bastian, 1865

Superfamily APHELENCHOIDOIDEA Skarbilovich, 1947
(Siddiqi, 1980)

Family APHELENCHOIDIDAE Skarbilovich, 1947
(Pararnonov, 1953)

Subfamily APHELENCHOIDINAE Skarbilovich, 1947

Genus *Aphelenchoides* Fischer, 1894

44. *Aphelenchoides besseyi* Christie, 1942

45. *Aphelenchoides parascalcaudatus* Chawla, Bhamburkar, Khan & Prasad, 196

Order DORYLAIMIDA Pearse, 1942

Suborder DORYLAIMINA Pearse, 1936

Superfamily DORYLAIMOIDEA de Man, 1876

Family DORYLAIMIDAE de Man, 1876

Subfamily DORYLAIMINAE de Man, 1876

Genus *Dorylaimus* Dujardin, 1845

46. *Dorylaimus stagnalis** Dujardin, 1845

47. *Dorylaimus* sp. n.

Genus *Laimydorus* Siddiqi, 1969

48. *Laimydorus baldus* Baqri & Jana, 1982

49. *Laimydorus finalis* Thorne, 1975

50. *Laimydorus kherai* Baqri, 1985

Genus *Calodorylaimus* Andrassy, 1969

51. *Calodorylaimus wasimi* Baqri & Bohra, 2003

Genus *Mesodorylaimus* Andrassy, 1959

52. *Mesodorylaimus adalbarti* Andrassy, 1963
 53. *Mesodorylaimus brassicus* Soni & Nama, 1981
 54. *Mesodorylaimus caudatus* Ahmad, 1993
 55. *Mesodorylaimus margeritus* Basson & Heyns, 1974
 56. *Mesodorylaimus mesonyctius** (Kreis, 1930) Andrassy, 1959
 57. *Mesodorylaimus szunyoghyi* Andrassy, 1968

Subfamily THORNENEMATINAE Siddiqi, 1969

Genus *Thornenema* Andrassy, 1959

58. *Thornenema mauritianum* (Williams, 1959) Baqri & Jairajpuri, 1969
 59. *Thornenema baldum** (Thorne, 1939) Andrassy, 1959

Genus *Prothornenema* Baqri & Bohra, 2003

60. *Prothornenema capitatum* Baqri & Bohra, 2003

Genus *Sicaguttur* Siddiqi, 1971

61. *Sicaguttur sartum* Siddiqi, 1971

Family APORCELAIMIDAE Heyns, 1965

Genus *Makatinus* Heyns, 1965

62. *Makatinus* sp. n.

Subfamily APORCELAIMINAE Heyns, 1965

Genus *Aporcelaimellus* Heyns, 1965

63. *Aporcelaimellus heynsi* Baqri & Jairajpuri, 1968

Genus *Tubixaba* Monteiro & Lordello, 1980

64. *Tubixaba parva* Pretorius, Kruger & Heyns, 1987

Family QUDSIANEMATIDAE Jairajpuri, 1965

Subfamily QUDSIANEMATINAE Jairajpuri, 1965

Genus *Labronema* Thorne, 1939

65. *Labronema confusum* (Jana & Baqri, 1983) Andrassy, 1991

Genus *Eudorylaimus* Andrassy, 1959

66. *Eudorylaimus* sp. n.
 67. *Eudorylaimus chauhani** (Baqri & Khera, 1975) Andrassy, 1986

Genus *Ecumenicus* Thorne, 1974

68. *Ecumenicus monohystera* (De Man, 1880) Thorne, 1974

Genus *Allodorylaimus* Andrassy, 1986

69. *Allodorylaimus kosambaensis* Khan, Ahmad & Jairajpuri, 1995

Subfamily DISCOLAIMINAE Siddiqi, 1969

Genus *Discolaimus* Cobb, 1913

70. *Discolaimus major* Thorne, 1939
 71. *Discolaimus texanus** Cobb, 1913
 72. *Discolaimus tenax** Siddiqi, 1964

Genus *Discolaimium* Thorne, 1939

73. *Discolaimium mukhtarpuriense* Baqri & Jairajpuri, 1969
 74. *Discolaimium simplex** Siddiqi, 1965

Genus *Discolaimoides* Heyns, 1963

75. *Discolaimoides bulbiferus* (Cobb, 1906) Heyns, 1963
 76. *Discolaimoides intrastriatus** (Loss, 1945) Loof, 1964

Genus *Latocephalus* Patil & Khan, 1982

77. *Latocephalus gracile* Patil & Khan, 1982
 78. *Latocephalus smithi** (Heyns, 1963) Patil & Khan, 1982

Genus *Poronemella* Siddiqi, 1969

79. *Poronemella shamimi* Baqri & Bohra, 2003
 80. *Poronemella amini** Siddiqi, 1969

Genus *Moshajia* Siddiqi, 1982

81. *Moshajia cultristyla** Siddiqi, 1982
 82. *Moshajia idiofora** Siddiqi, 1982

Family NORDIIDAE Jairajpuri & A.H. Siddiqi, 1964

Subfamily NORDIINAE Jairajpuri & A.H. Siddiqi, 1964

Genus *Longidorella* Thorne, 1939

83. *Longidorella xenura* Khan & Siddiqi, 1963

Subfamily PUNGENTINAE Siddiqi, 1969

Genus *Kochinema* Heyns, 1963

84. *Kochinema farodai* Baqri & Bohra, 2001
 85. *Kochinema caudatum* Baqri & Bohra, 2001

Subfamily ACTINOLAIMOIDINAE Jairajpuri & Ahmad, 1992

Genus *Oriverutus* Siddiqi, 1971

86. *Oriverutus labiatus* Ahmad & Jairajpuri, 1987

Superfamily ACTINOLAIMOIDEA Thorne, 1939

Family ACTINOLAIMIDAE Thorne, 1939

Subfamily NEOACTINOLAIMINAE Thorne, 1967

Genus *Neoactinolaimus* Thorne, 1967

87. *Neoactinolaimus kosambus* Khan, Ahmad & Jairajpuri, 1994
 88. *Neoactinolaimus attenuatus* Khan, Ahmad & Jairajpuri, 1994

Superfamily LONGIDOROIDEA Thorne, 1935

Family LONGIDORIDAE Thorne, 1935

Subfamily LONGIDORINAE Thorne, 1935

Genus *Longidorus* Micoletzky, 1922 (Filipjev, 1934)

89. *Longidorus elongatus* (de Man, 1876) Micoletzky, 1922
 90. *Longidorus sylphus* Thorne, 1939

Genus *Paralongidorus* Siddiqi, Hooper & Khan, 1963

91. *Paralongidorus beryllus* (Siddiqi, Husain, 1965) Hunt, 1993
 92. *Paralongidorus citri* (Siddiqi, 1959) Siddiqi, Hooper & Khan, 1963
 93. *Paralongidorus major* Verma, 1973
 94. *Paralongidorus microlaimus* Siddiqi, 1964

Family XIPHINEMATIDAE Dalmasso, 1969

Subfamily XIPHINEMATINAE Dalmasso, 1969

Genus *Xiphinema* Cobb, 1913

95. *Xiphinema americanum* Cobb, 1913
 96. *Xiphinema basiri* Siddiqi, 1959

97. *Xiphinema elongatum* Sch. Stekhoven & Teunissen, 1938
 98. *Xiphinema insigne* Loos, 1949
 99. *Xiphinema orbum* Siddiqi, 1964

Superfamily BELONDIROIDEA Thorne, 1939

Family BELONDIRIDAE Thorne, 1939

Subfamily BELONDIRINAE Thorne, 1939

Genus *Belondira* Thorne, 1939

100. *Belondira bulbosa* Siddiqi, 1966
 101. *Belondira porta* Thorne, 1964
 102. *Belondira tenuidens* Thorne, 1964

Genus *Axonchium* Cobb, 1920

103. *Axonchium (Axonchium) buibosum* Williams, 1958
 104. *Axonchium (Axonchium) nitidum* Jairajpuri, 1964

Subfamily DORYLAIMELLINAE Jairajpuri, 1964

Genus *Dorylaimellus* Cobb, 1913

105. *Dorylaimellus (Dorylaimellus) demani* Goodey, 1963
 106. *Dorylaimellus (Axodorylaimellus) parvulus* Thorne, 1939
 107. *Dorylaimellus (Belondorylaimellus) discocephalus* Siddiqi, 1964

Superfamily TYLENCHOLAIMOIDEA Filipjev, 1934

Family TYLENCHOLAIMIDAE Filipjev, 1934

Subfamily TYLENCHOLAIMINAE Filipjev, 1934

Genus *Tylencholaimus* de Man, 1876

108. *Tylencholaimus nagauriensis* Baqri & Bohra, 2001
 109. *Tylencholaimus leptonchoides* Loof, 1964
 110. *Tylencholaimus gertii* Kruger, 1965
 111. *Tylencholaimus annulatus* Baqri & Bhora, 2001

Genus *Utahnema* Thorne, 1939

112. *Utahnema tenuidens* Thorne, 1939

Genus *Metadorylaimus* Jairajpuri & Goodey, 1966

113. *Metadorylaimus* sp. n.

Family LEPTONCHIDAE Thorne, 1935

Subfamily LEPTONCHINAE Thorne, 1935

Genus *Leptonchus* Cobb, 1920

114. *Leptonchus granulatus* Cobb, 1920

Genus *Proleptonchus* Lordello, 1955

115. *Proleptonchus clarus* Timm, 1964

Subfamily TYLEPTINAE Jairajpuri, 1964

Genus *Tyleptus* Thorne, 1939

116. *Tyleptus projectus* Thorne, 1939

Family MYDONOMIDAE Thorne, 1964

Subfamily MYDONOMINAE (Thorne, 1964),
Jairajpuri & Ahmad, 1992

Genus *Dorylaimoides* Thorne & Swanger, 1936

117. *Dorylaimoides (Digidorylaimoides) micoletzkyi* (de Man, 1921) Thorne & Swanger, 1936)

118. *Dorylaimoides (Longidorylaimoides) leptura* Siddiqi, 1965

119. *Dorylaimoides (Dorylaimoides) parateres* Siddiqi, 1964

120. *Dorylaimoides (Tarjania) constrictoides* Goseco, Ferris & Ferris, 1976

Suborder NYGOLAIMINA Ahmad & Jairajpuri, 1979

Superfamily NYGOLAIMOIDEA Thorne, 1935

Family NYGOLAIMIDAE Thorne, 1935

Subfamily NYGOLAIMINAE Thorne, 1935

Genus *Nygolaimus* Cobb, 1913

121. *Nygolaimus anneckei** Heyns, 1935

122. *Nygolaimus harishi** Ahmad & Jairajpuri, 1980

Genus *Aquatides* Heyns, 1968

123. *Aquatides aquaticus* (Thorne, 1930) Thorne, 1974

124. *Aquatides thornei* (Schneider, 1937) Ahmad & Jairajpuri, 1982

125. *Aquatides* sp. n.

Order MONONCHIDA Jairajpuri, 1969
 Suborder MONONCHINA Kirjanova & Krall, 1969
 Superfamily MONONCHOIDEA Chitwood, 1937
 Family MONONCHIDAE Chitwood, 1937
 Genus *Mononchus* Bastian, 1865

126. *Mononchus aquaticus* Coetzee, 1968

Family MYLONCHULIDAE Jairajpuri, 1969
 Genus *Mylonchulus* (Cobb, 1916) Altherr, 1953

127. *Mylonchulus contractus* Jairajpuri, 1970

128. *Mylonchulus hawaiiensis* (Cassidy, 1931) Andrassy, 1958

129. *Mylonchulus lacustris* (N.A. Cobb in M.V. Cobb, 1915) Andrassy, 1958

130. *Mylonchulus minor* (Cobb, 1893) Andrassy, 1958

131. *Mylonchulus subsimilis* (Cobb, 1917) Meyl, 1957

Genus *Sporonchulus* (Cobb, 1917) Andrassy, 1958

132. *Sporonchulus vagabundus* Jairajpuri, 1971

Family IOTONCHIDAE Jairajpuri, 1969
 Genus *Iotonchus* (Cobb, 1916) Altherr, 1950

133. *Iotonchus jairi* (Lordello, 1958) Clark, 1960

SUMMARY

In all, 133 species of plant and soil nematodes belonging to 60 genera of 27 families under four orders viz., Tylenchida, Aphelenchida, Dorylaimida and Mononchida are now known from Gujarat. The 13 species reported for the first time from the state are : *Dorylaimus stagnalis*, *Mesodorylaimus mesonyctius*, *Thornenema baldum*, *Eudorylaimus chauhani*, *Discolaimus texanus*, *Discolaimus tenax*, *Discolaimium simplex*, *Discolaimoides intrastriatus*, *Latocephalus smithi*, *Poronemella amini*, *Moshajia cultristyla*, *Moshajia idiofora*, *Nygolaimus anneckeii* and *Nygolaimus harishi*. The description and illustrations of five new species mentioned in paper will be provided in separate paper.

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