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AN ANNOTATED LIST OF PROTOZOAN PARASITES BELONGING TO THE GENUS *MONOCYSTIS VON* STEIN, 1848 (APICOMPLEXA: CONOIDASIDA: EUGREGARINIDIDA: MONOCYSTIDAE) DESCRIBED FROM OLIGOCHAETE HOSTS

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INTRODUCTION

Apicomplexan are parasitic, with the gregarines exclusively infecting invertebrate hosts. Gregarines are a group with two forms, septate and aseptate. Aseptate gregarines contains 400 species while the septate gregarines contains about 900 species (Levine, 1977). In the aseptate gregarines (acephaline) the trophozoite has one compartment while in the septate forms (cephaline) there are several compartments. Gregarines are certainly significant from an evolutionary point of view because of their suspected early diverging position. The genus *Monocystis* was established by Von Stein in 1848. They are chiefly coelozoic or lumen dwelling protozoan of invertebrates, especially arthropods and annelids, considered as aseptate gregarines. Genus *Monocystis* Von Stein, 1848, are characterized by, without any mucorn, ovoid gamonts, short or elongated body, solitary, biconical oocysts, and symmetrical (Levine, 1988). Some species are especially important because they can cause diseases in invertebrates. Only few reports are available concerning biodiversity among *Monocystis* species based on morphological characterization. Levine, 1988 listed seventy four species of the genus *Monocystis* under the family Monocystidae, two of them have been described from non oligochaete hosts. Later on, many scientists worked on the aseptate gregarines. Many species of the genus *Monocystis* have been described from different oligochaete hosts of different geographical region. Till date eighty five species of *Monocystis* have so far been established throughout the world from the oligochaete hosts. But there is no systematic checklist of the species. In view of this it is considered useful to prepare a updated checklist of the species. The checklist is presented below in Table: 1. Tabulated are the type hosts, distribution, site of infection and the original reference to the data.

REMARKS

The paper contains the name of eighty six described species of the genus *Monocystis* under the family Monocystidae from oligochaete hosts.

SUMMARY

In this communication, eighty six species belonging to the genus *Monocystis* Von Stein, 1848 have been incorporated. The species have been described from different oligochaete hosts from different geographical distribution. The sites of infections have also been indicated. The paper will throw some light on the systematics of *Monocystis* species, since study of *Monocystis* is important from the evolutionary point of view.

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Table 1 : An annotated list of *Monocystis* species, type hosts, distribution, site of infection and original references are tabulated below. Sv=Seminal Vesicles, C=Coelom, Ints=Intestine, Ovr=Ovary, T= Testes

Name of the *Monocystis* species	Host (s)	Distribution	Site of infections
M. agilis Von Stein, 1848	*Lumbricus terrestris, L. rubellus L. castaneus, Allolobophora longa, Pheretima hypeiensis, Eisenia foetida*	England, France, Germany, Hungary, Poland, Sweden, USSR, Mexico	SV
M. perichaetae (Beddard, 1888) Labbé, 1899	*Megascolex (Syn., Perichaeta) novaezealandiae, M. mauritii, Diporochaeta intermedia, M. armatus*	New Zealand, Mauritius	C
M. lumbrici (Henle, 1845) Cuénot, 1901	*Lumbricus terrestris, L. rubellus, L. castaneus, Eisenia foetida*	Poland, Sweden, England France, Germany	SV
M. ciliata Drzhevetskii, 1907	*Allolobophora longa*	USSR	SV and C
M. crenulata Hesse, 1909	*Allolobophoro longa, A. caliginosa, A. caliginosa var. trapezoides*	France, Hungary	SV
M. hirsuta Hesse, 1909	*Lumbricus casteneus*	France, Germany	SV
M. lememei Hesse, 1909	*Allolobophora caliginosa, Octolasium complanatum*	France, Algeria	SV
M. duboscqi Hesse, 1909	*Lumbricus variegates*	France	SV
M. bretscheri Hesse, 1909	*Fridericia polycheta*	France	C
M. macrospora Hesse, 1909	*Pheretima hawayana, P. rodericensis*	France	C
M. striata Hesse, 1909	*Lumbricus terrestris, L. rubellus, L. castaneus,*	England, France, Germany	SV
M. turbo Hesse, 1909	*Octolasium lacteum, Eisenia foetida*	France, Germany	SV
M. arcuata Boldt, 1910a	*Lumbricus castaneus, L. rubellus, Eisenia foetida*	Sweden, England, Germany	SV
M. piriformis Boldt, 1910b	*Octolasium complanatum, O. transpadanum, Fridericia galba, F. Hegemon*	Germany, France, Hungary	SV and C
M. catenata Mulsow, 1911	*Lumbricus terrestris* and *L. rubellus*	Germany	C
M. thamnodrili Cognetti de martiis, 1911	*Thamnodrilus incertus*	Equador	C
M. perforans Pinto, 1918	*Glossoscolex wiengreeni*	Brazil	T
M. naidis von Voss, 1921	*Nais elinguis or N. obtusa*	Germany	C
M. beddardi Ghosh, 1923	*Eutyphaeus nicholsoni*	India	SV
M. bengalensis Ghosh, 1923	*Pheretima posthuma*	India	SV
M. suecica Berlin, 1923	*Eisenia foetida, L. terrestris, L. rubellus*	Sweden	SV and C
M. tubiformis Berlin, 1923	*Lumbricus rubellus, L. castaneus*	Sweden	SV
M. acuta Berlin, 1924	*Lumbricus rubellus, L. castaneus*	Poland, Sweden	SV and C

M. carlgrenii Berlin, 1924	*Lumbricus terrestris, L. rubellus*	Sweden	SV
M. caudata Berlin, 1924	*Lumbricus rubellus, L. castaneus, Allolobophora longa*	Poland, Sweden	SV
M. densa Berlin, 1924	*Lumbricus terrestris, L. rubellus, L. castaneus, Eisenia foetida, Allolobophora longa, A. caliginosa,* and *A. chlorotica*	Poland, Sweden, England	SV
M. hessei Berlin, 1924	*Lumbricus terrestris, L. rubellus*	Sweden, England	SV
M. oblonga Berlin, 1924	*Lumbricus terrestris, L. rubellus, L. castaneus, Allolobophora longa*	Sweden	SV and C
M. polymorpha Berlin, 1924	*Lumbricus rubellus*	Poland, Sweden	SV
M. securiformis Berlin, 1924	*Allolobophora caliginosa*	Sweden	SV
M. ventrosa Berlin, 1924	*Lumbricus rubellus, L castaneus, Eisenia foetida*	Sweden, France, Germany, Hungary	SV and C
M. wallengrenii Berlin, 1924	*Allolobophora c. caliginosa, A. longa, Lumbricus rubellus*	England, Poland, Sweden, France, Germany	SV
M. pheretimae Bhatia and Chatterjee, 1925	*Pheretima posthuma*	India	SV and C
M. mrazeki Hahn, 1928	*Rhynchelmis limosella, R. komareki*	Czechoslovakia	SV
M. criodrilii Sciacchitano, 1931	*Criodrilus lacuum*	Italy	SV
M. banyulensis Tuzet and Loubatiers, 1946	*Octolasium complanatum* and *Dichrogaster baeri*	France	SV
M. octolasii Tuzet and Loubatiéres, 1946	*Octolasium complanatum*	France	SV
M. setosa Tuzet and Loubatiéres, 1946	*Allolobophora gigas*	France	SV
M. buccalis Tuzet and Loubatiéres, 1948	*Allolobophora gigas*	France	SV
M. lloydi Ghosh, 1923 emend, Loubatiéres, 1955	*Pheretima posthuma*	India	SV
M. dichogasteri Tuzet and Zuber-Vogeli, 1955	*Dichogaster inermis*	France, West Africa	SV
M. hederacea Loubatiéres, 1955	*Allolobophora rosea*	France	SV
M. lopadiformis Loubatiéres, 1955	*Eisenia foetida*	France	SV
M. proteiformis Loubatiéres, 1955	*Eisenia foetida*	France	SV
M. capillata Tuzet and Vogeli, 1956	*Millsonia anomala*	France, West Africa	SV
M. eudrilii Tuzet and Vogeli, 1956	*Eudrilus eugeniae*	Ivory Coast	VS and C
M. lumbricoides (Hesse, 1909), Meier, 1956	*Allolobophora c. caliginosa, A. longa, A. r. rosea, Dendrobaena tenuis, Eisenia foetida* and *Pheretima heterochaeta*	England, France, Germany, India	SV

Name of the *Monocystis* species	Host (s)	Distribution	Site of infections
M. lobosa Tuzet and Vogeli, 1956	*Millsonia anomala*	France, West Africa	SC
M. omodeoi Tuzet and Vogeli, 1956	*Dichogaster baeri*	France, West Africa	SV
M. longispora Boisson, 1957	*Perionyx excavates*	Indo-China	SV
M. biacuminata Boisson, 1957	*Glossoscolex corethrurus*	Indo-China	SV
M. minor Boisson, 1957	*Pheretima peguana*	Indo-China	SV
M. nidata Boisson, 1957	*Pontodrilus ephippiger*	Indo-China	SV
M. radiata Boisson, 1957	*Glossoscolex corethrurus*	Indo-China	-
M. cambrensis Rees, 1961	*Eisenia foetida*	Wales	C
M. lanceata Rees, 1961	*Allolobophora caliginosa*	Wales	SV
M. mollis Bereczky, 1967	*Dendrobaena platyura var. montana*	Hungary	SV
M. mammillae Segun, 1968	*Dendrobaena mammalis*	England	C
M. rhabdota Giere, 1971	*Lumbricillus lineatus*	Germany	SV and C
M. lumbricilli Giere, 1971	*Lumbricillus lineatus*	Germany	SV and C
M. tupi Righi, 1974	*Tupidrilus lacteus, Guaranidrilus oiepe*	Brazil	SV
M. loubatiersi Levine, 1977	*Eisenia foetida*	France	SV
M. saigonensis Boisson, 1957, emend. Levine, 1977	*Pheretima saigonensis*	Indo-China	-
M. tuzetae Levine, 1977	*Octolasium complanatum*	France	SV
M. berlini Levine, 1977	*Lumbricus rubellus*	Sweden	SV
M. boissoni Levine, 1977	*Pheretima posthuma*	Indo-China	SV
M. eiseniae Levine, 1977	*Eisenia foetida*	France	SV and C
M. abegbei Segun, 1978	*Libyodrilus violaceus*	Nigeria	Haemocoel
M. libyodrili Segun, 1978	*Libyodrilus violaceus*	Nigeria	C and Body Muscle
M. pontodrili Subbarao, Kalavati and Narasimhamurti, 1979	*Pontodrilus barmudensis*	Lalbag, Murshidabad, West Bengal, India	SV
M. senchalensis Pradhan and Dasgupta, 1982	*Apporectodae trapezoides*	Darjeeling, India	SV
M. lalbagensis Bandyopadhyay *et al*, 2001	*Metaphire posthuma*	Lalbag, Murshidabad, West Bengal, India	SV
M. nadiensis Bandyopadhyay and Biswas, 2002	*Metaphire posthuma*	Fulia, Nadia, India	C

M. darjeelingensis Bandyopadhyay and Mitra, 2005a	*Amynthus robusta*	Senchal, Darjeeling, India	SV
M. ranaghatensis Bandyopadhyay and Mitra, 2005a	*Eutyphoeus valtoni*	Ranaghat, West Bengal, India	SV
M. levinei Bandyopadhyay *et al.*, 2005b	*Eutyphoeus incommodus*	Kalyani, West Bengal, India	SV
M. clubae Bandyopadhyay, *et al.*, 2006a.	*Lampito mauritii*	West Bengal, India	SV
M. apporectodae Bandyopadhyay *et al.*, 2006b	*Apporectodae trapezoides*	Bankura, West Bengal, India	SV
M. metaphire Bandyopadhyay *et al.*, 2006c	*Metaphire houlleti*	Madhyamgram, North 24 pgs, West Bengal, India	SV
M. amynthae Bandyopadhyay *et al.*, 2006d	*Amynthas hawayanus*	Darjeeling	SV
M. arabindae Bandyopadhyay *et al.*, 2007	*Eutyphoeus incommodus*	West Midnapur, West Bengal, India	SV
M. elongatum Bandyopadhyay *et al.*, 2008	*Perionyx excavates*	Murshidabad, West Bengal, India	SV
M. septum Bandyopadhyay *et al.*, 2009a	*Eutyphoeus orientalis*	Murshidabad, West Bengal, India	SV
M. constricta Bandyopadhyay *et al.*, 2009b	*Eutyphoeus quaripallatus*	Calcutta, West Bengal, India	SV
M. lampitae Bhowmik *et al.*, 2011a	*Lampito mauritii*	Bagdaha, West Bengal, India	SV
M. ayeshae Sarkar and Bandyopadhyay, 2011b	*Metaphire posthuma*	Satkhira, Bangladesh	SV

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