

Zooplankton Biodiversity of Minas Gerais State: a Preliminary Synthesis of Present Knowledge.

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ABSTRACT: Zooplankton Biodiversity of Minas Gerais State: a Preliminary Synthesis of Present Knowledge. In this preliminary synthesis of the present state of knowledge of zooplanktonic biodiversity in Minas Gerais a survey was done through bibliographic consultation of the inventory of zooplanktonic species in several aquatic ecosystems. A total of 551 species were listed, represented by 151 Protozoa taxa, 300 Rotifera, 68 Cladocera, 30 belonging to Copepoda and 02 of insect larvae. Our analysis indicate that the ecological studies that contemplate the taxonomic diagnosis of the zooplankton are concentrated specially in the aquatic ecosystems situated in the hydrographic basins of the São Francisco, Grande and Doce Rivers while in other important hydrographic basins of the State such as Paranaíba and Jequitinhonha Rivers very incipient information from zooplanktonic inventory has been found. Some information gaps in the record of zooplanktonic species (specially Protozooplankton and Ostracoda) have limited a deeper knowledge on the species richness. Studies targeted at estimating zooplanktonic species from ecosystems and groups still not well investigated should be included in future ecological research initiatives as a means to amplify and deepen the knowledge of zooplanktonic diversity and conservation state of aquatic ecosystems of Minas Gerais.

Key-words: zooplankton, biodiversity, Minas Gerais.

RESUMO: Biodiversidade zooplanctônica do Estado de Minas Gerais: síntese preliminar do estado atual de conhecimento. Nesta síntese preliminar do estado atual de conhecimento da biodiversidade zooplanctônica em Minas Gerais, foi realizado um levantamento, através de consulta bibliográfica, do inventariamento de espécies zooplanctônicas em diversos ecossistemas aquáticos. Foram listadas 551 espécies, representadas por 151 táxons de Protozoa, 300 de Rotifera, 68 de Cladocera, 30 táxons pertencentes a Copepoda e 02 de larvas de insetos aquáticos. Pela consulta realizada, os estudos ecológicos que contemplam a diagnose taxonômica do zooplâncton têm se concentrado principalmente nos ecossistemas aquáticos situados nas bacias hidrográficas dos rios São Francisco, Grande e Doce, com informações ainda muito incipientes no inventariamento zooplanctônico de outras importantes bacias hidrográficas do Estado, como as do rio Paranaíba, Grande e Jequitinhonha. Algumas lacunas no registro de espécies zooplanctônicas (principalmente do Protozooplâncton e Ostracoda) têm limitado um conhecimento mais aprofundado da riqueza de espécies. Estudos voltados à estimativa de espécies zooplanctônicas de ecossistemas e grupos ainda pouco estudados devem estar inseridos nas futuras iniciativas de pesquisa ecológica, como forma de ampliar e aprofundar o conhecimento da diversidade zooplanctônica e estado de conservação dos ecossistemas aquáticos de Minas Gerais.

Palavras-chave: zooplâncton, biodiversidade, Minas Gerais.

Introduction

Brazil is one of countries considered as megadiverse, due to the exceptionally rich biological diversity. However, according to Lewinsohn & Prado (2002), a very

deficient picture still exist about the present knowledge on the diversity of aquatic invertebrate species in Brazil since a great part of the studies performed are concentrated in Arthropoda and, among those almost 90% focus on Insecta.

Aquatic invertebrates stand out because of the enormous species richness (Wilson, 1999) and, in addition to that they have a great ecological importance since they directly participate in ecosystem maintenance processes (Purvis & Hector, 2000). Despite this fact, this group has been scarcely considered in the elaboration of management and conservation plans. However, researchers have been more frequently suggesting the inclusion of invertebrates in the protocols for environment impact evaluation, not only by its occurrence in several environments but also by the possibility of using species sensitive to environmental alterations as bioindicators and monitors of the quality and health of ecosystems (Majer, 1987).

The state of Minas Gerais stands out in the pioneering of limnological studies and a great amount of information about zooplanktonic communities has been generated from these studies (Okano, 1980; Matsumura-Tundisi, 1997; Pinto-Coelho, 1998, among others). In some of them, profound modifications that occurred in the planktonic community structure have been described, including disappearing of species due to alterations in environmental characteristics (Arvola et al., 1993; Pinto-Coelho et al., 2003).

Some of the main hydrographic basins of Minas Gerais exhibit an elevated industrialization index, including steel industries and cellulose production, in addition to habitat fragmentation and intense urban growth that has been drastically affecting the water quality and maintenance of biodiversity (De Paula, 1997).

This way, a global synthesis of the zooplanktonic biodiversity can be a reference for the present state of knowledge, pointing out the gaps to be filled and above all, guiding initiatives in all levels (regional, national, academic, social, etc.) for a betterment of knowledge, conservation and management of aquatic biodiversity.

This initiative represents the first attempt to synthesize the present knowledge on the zooplanktonic biodiversity of Minas Gerais. Although preliminary, it can possibly be used in the future as a reference tool. This diagnosis will also contribute for the formulation of research projects that contemplate environments and zooplanktonic groups that, although of fundamental importance for the full knowledge about zooplanktonic biodiversity and state of conservation of aquatic ecosystems of Minas Gerais, have not been well studied up to this moment.

Materials and methods

Information about the zooplanktonic community of 23 lakes, 22 reservoirs and 14 rivers of the major hydrographic basins of the Minas Gerais State were compiled. These basins represent 98% of total area of Minas Gerais State covering an area of 577.015km². For the present diagnosis different sources of information, including articles published in international and Brazilian journals, monographs, dissertations and theses, conference abstracts and monitoring reports were consulted (Annex 1).

Results and discussion

Tab. 1 summarizes the available information on the zooplanktonic diversity in Minas Gerais represented currently by 551 species distributed into 151 Protozoa taxa, 300 Rotifera, 68 Cladocera, 30 belonging to Copepoda and 02 of insect larvae.

A geographic partition of the studied environments of the different hydrographic basins of Minas Gerais shows a marked inter-regional difference; almost 70% of the zooplanktonic inventory is concentrated in the basins of the São Francisco, Grande and Doce Rivers where some of the main reservoirs of Minas Gerais are located (Fig. 1). In this study it was observed a great gap in the zooplanktonic inventory in

Table 1: Taxonomic list and occurrence of the zooplankton in Minas Gerais State. Numbers indicate the location where the species were registered (see Fig. 1).

Protozoa	
<i>Arcella braziliensis</i> - 1,37,40	<i>C. cassis</i> - 27,37
<i>A. catinus</i> - 6,9,19,32,38,44,47,48,51,54,56,57,59	<i>C. consuetica</i> - 16,20,21,23,26,52,56,58,59
<i>A. conica</i> - 1,2,3,4,10,13,20,26,27,32,37,40,48,50,54,57	<i>C. discoides</i> - 3,40
<i>A. costata</i> - 1,3,5,10,13,20,21,22,24,26,27,32,33,40,41,53,54,56,57,58	<i>C. ecomis</i> - 3,5,15,20,23,24,25,26,27,37,38,40,48,50,52,54,56,57,58
<i>A. crenata</i> - 37	<i>C. gibba</i> - 27
<i>A. crenulata</i> - 40,52,54,58	<i>C. hemisphaerica</i> - 44,52,57,58
<i>A. denata</i> - 1,13,22,27,37,38,44,47,54,56,57,58,	<i>C. hirsuta</i> - 3,4,10,20,27,40
<i>A. discoides</i> - 1,3,5,8,10,12,15,20,22,23,24,25,27,30,33,34,37,40,49,52	<i>C. impressa</i> - 57
<i>A. excavaia</i> - 37	<i>C. marsupiformis</i> - 3
<i>A. gibbosa</i> - 22,27,37,40,48,50,57,58	<i>C. minuta</i> - 27,40
<i>A. hemisphaerica</i> - 1,2,3,4,10,13,14,15,20,22,23,25,26,27,28,32,35,37,40,48,50,54,56,57,58	<i>C. platystoma</i> - 34,40
<i>A. hemisphaerica alliae</i> - 27	<i>C. spinosa</i> - 3
<i>A. hemisphaerica minima</i> - 23, 27	<i>C. stellata</i> - 59
<i>A. hemisphaerica f. undulata</i> - 23, 27, 35	<i>Chaos diffluens</i> - 27
<i>A. hemisphaerica hemisphaerica</i> - 27	<i>Ciliados</i> - 5,19,20,21,24,26,30,32,53,55
<i>A. cf irregularis</i> - 40	<i>Coleps hirtus</i> - 48
<i>A. lobostoma</i> - 13, 27, 37	<i>Codonella cratera</i> - 19,26,27,28,32,35
<i>A. megastoma</i> - 3,13,23,35,37,40,48	<i>Cucurbitella madagascariensis</i> - 3,40
<i>A. mirata</i> 37, 48	<i>C. mespiliformes</i> - 40,52
<i>A. mirata v. spectabilis</i> - 40	<i>Cyclopyxis eurystoma</i> - 52,58
<i>A. marginata</i> - 37	<i>C. impressa</i> - 57,58
<i>A. polypora</i> - 27, 37, 59	<i>C. kahli</i> - 3,15,54
<i>A. roa</i> - 1, 10, 13	<i>Cyphoderia ampulla</i> - 15,16,22,23,25,26,27,32,33,34,35,37,40
<i>A. rotundata</i> - 23,25,34,37,40,50	48,50,57,59
<i>A. rotundata v. alta</i> - 37	<i>Diclinium balbianni</i> - 59
<i>A. rugosa</i> - 5,6,20,21,24,53	<i>D. nasutum</i> - 59
<i>A. vulgaris</i> - 1,3,5,6,8,10,9,11,13,14,15,16,19,20,21,22,24,25,26,27,28,32,34,37,38,40,42,44,47,48, 49,50,51,52,53,54,56,57,58,59	<i>Diffugia acuminata</i> - 3,4,5,16,20,21,24,27,32,37,40,57,58,59
<i>A. vulgaris penardi</i> - 27	<i>D. acuminata var. inflata</i> - 58
<i>Astramoeba radiosa</i> - 27	<i>D. acutissima</i> - 1,3,23
	<i>D. angulostoma</i> - 3,15,37
	<i>D. bicornis</i> - 3
	<i>D. capreolata</i> - 3

Table 1: Cont.

Campanella umbellaria - 14,26,27,28,30,32,33,35,37,48,49,50,59	D. congolensis - 40
Centropyxis aërophila - 27	D. corona - 1,3,4,5,10,13,20,23,24,27,37,40,53,57
C. aculeata - 3,4,5,6,8,10,11,12,13,14,15,16,20,21,22,23,24,25,26,27 28,32,33,34,35,37,40,44,47,48,50,52,53,54,55,56,57,58,59	D. corona crenulata - 4,13,20
C. aculeata v. tropica - 3	D. curvicaulis - 40
C. aërophila - 40	D. difficilis - 23,40
C. arcelloides - 5,6,8,16,20,21,22,24,25,27,38,51,52,53,54,56,57,58,59	D. echinulata - 27
D. globularis - 13,49	D. elegans - 1,3,4,10,13,20,23,27,35,40,58
D. globulosa - 12	Hellozoïda - 15,34
D. gramen - 1,3,27,35,37,40	Hyalosphenia elegans - 48
D. gramen achlora - 4,13,20,23	Lesquereusia epistomium - 3
D. gramen globularis - 35	L. gibbosa - 40,57
D. hydrostatica - 3	L. modesta - 3,5,16,20,22,24,27,32,40,57,58,59
D. kempnyi - 40	L. spiralis - 1,3,4,5,6,8,10,12,20,21,24,26,27,32,33,35,37,40,53,56,57,58
D. lebes - 5,20,27,53,59	Nebela caudata - 52
D. limnetica - 26	N. nobilis - 48
D. linearis - 27	N. fabrei - 48
D. lismoriensis - 20	N. flabellulum - 25,29
D. lithophila - 3,27,40	N. collaris - 35,37,48,50
D. lobostoma - 3,5,13,15,23,24,27,32,36,37,40,48,49,50,59	N. laugeliformes - 32,59
D. lobostoma multilobata - 3	N. tubulata - 15
D. lucida - 4,20,27,40	Netzelia oviformis - 3
D. microclaviformis - 3	N. tuberculata - 3
D. microstoma - 3	N. waitlesi - 3,15
D. muriformis - 1,3,13,40,58	Paraeuglypha reticulata - 59
D. minuta - 37	P. aurelia - 27
D. oblonga - 2,3,4,5,10,15,16,19,20,21,24,27,33,34,37,52,53 54,56,58,57,40	P. caudatum - 33
D. oblonga nodosa - 1,10	P. trichium - 27
D. pseudogramen - 3,40	Paulinella chromatophorce - 25
	Pentagonia macroccana - 3
	Pontigulasia compressa - 3,57

Table 1: Cont.

D. penardi - 27	Protocurbiella coroniformis - 3
D. rubescens - 5,16,24,53	Quadrullela symmetrica - 21,24,27,32,37,50,52,57
D. sarissa - 40	Q. tubulata - 26,27,32
D. schuurmani - 1,10,13,37,40	Raphidiophrys viridis - 15
D. tuberculata - 1,37,59	Rhizopoda - 19
D. urceolata - 1,3,5,13,20,21,24,50,53,56	Sudiifluga multipora - 1,2,3,4,10,13,20
Euglypha acanthophora - 3,5,13,15,20,21,22,24,26,27,32,40,43,50,53	Tintinnidae - 25,26
E. aiveolata - 32	Trichodina pediculus - 25,27,28
E. brachiata - 27,59	Trigonopyxis arcuata - 27,52
E. ciliata - 8,16,25,40,48,58,59	T. enchelys - 3,15,16,27,32,37,40,48
E. crenulata - 15,30,34	T. lineare - 3,5,20,21,24,40,53,57
E. denticulata - 3	Vorticella campanula - 33,59
E. filifera - 3	V. microstoma - 15,28,50
E. laevis - 14,16,27,48,50,59	Wailesella eboracensis - 27
E. lobostoma - 50	Zoothamnium arbuscula - 40
E. strigosa - 27	
E. tuberculata - 3,16,25,27,48,59	
Rotifera	
Anuaeropsis fissa - 1,10,14,16,17,19,25,27,28,50,59	B. rubens - 7,18
A. fissa fissa - 37	B. sessilis - 26,27,35,37
A. navicula - 1,13,15,26,27,30,32,33,34,35,37,42,46,49,59	B. urceolaris - 26,33,59
A. navicula navicula - 37	B. urceolaris urceolaris - 37
A. agilis - 16,32	B. urceolaris sessilis - 37
A. ecaudis - 1,10,13,15,26,27,28,30,32,35,37,49,59	Cephalodella catellina - 26,27,35
A. ovalis - 26,27,32,35,37	C. cf. exigua - 40
A. saltans - 1,15,19,27,28,30,32,37,48,50	C. forficula - 23,27,32,35,37
Asplanchna brightwelli - 37	C. gibba - 15,22,23,27,37,40,50,57,59
A. sieboldi - 2	C. mucronata - 5,20,24
Asplanchnopus hyalinus - 48	C. tenuiseta - 1,26,37
Bdelloidea - 1,2,5,7,8,9,10,11,12,13,15,16,19,20,21,22,23,24,25,26,27,30,32,34,35,38,40,41,42,43,44,47,51,52,53,54,55,56,57,58,59	Collotheca mutabilis - 26,27,32,35
	C. pelagica - 25,26,27,32,35,49,59
	Collotheca cf. sulcata - 35

Table 1. Cont.

<i>Beauchampiella eudactyloata</i> - 37,59	<i>Colurella adriatica</i> - 16,59
<i>Brachionus angularis</i> - 6,7,8,11,12,15,17,18,20,21,24,25,27,37,38,41,42 43,44,46,47,52,53,54,56,57,58	<i>C. obtusa</i> - 1,10,16,22,26,40,57
<i>B. angularis</i> var <i>chelonis</i> - 17	<i>C. uncinata</i> - 13,16,20,23,26,32,40
<i>B. bidentata</i> - 20,33,34,41,59	<i>C. uncinata bicuspidata</i> - 1,10,27,35,49
<i>B. budapestiensis</i> - 37	<i>Conochilus coenobasis</i> - 19,26,27,28,32,35,39,40,42,45,49
<i>B. calyciflorus</i> - 6,12,14,17,18,24,27,28,37,40,41,42,50,56,57,59	<i>C. dossuarius</i> - 2,10,13,25,27,37
<i>B. calyciflorus</i> <i>amphicerus</i> - 37	<i>C. hippocrepis</i> - 28
<i>B. calyciflorus</i> <i>f. dorcas</i> - 19,37	<i>C. natans</i> - 32
<i>B. caudatus</i> - 2,15,17,19,25,27,59	<i>C. unicomis</i> - 15,19,25,26,27,28,30,32,35,37,40,49,54
<i>B. dolabratus</i> - 1,6,7,8,9,10,11,12,15,19,20,21,24,25,27,32,35,37,38,44,47 53,57,59	<i>Dicranophorus caudatus</i> - 50
<i>B. falcatus</i> - 1,2,5,6,7,8,9,10,11,12,13,15,17,19,20,22,24,25,26,27,31,32 35,37,38,40,41,42,43,45,50,51,52,53,54,56,57,59	<i>D. caudatus braziliensis</i> - 1,4,10,13,20,37,48
<i>B. forficula</i> - 15,39,41,42,44,45,46,47	<i>D. epicharis</i> - 37
<i>B. macracanthus</i> - 40,54	<i>D. forcipatus</i> - 2,10,37
<i>B. mirabilis</i> - 37	<i>D. rostratus</i> - 15
<i>B. mirus</i> - 1,10,11,17,27,37,40,41,42,43,59	<i>D. propatula</i> - 13,40,54,57,59
<i>B. patulus</i> - 7,19,26,27,41,44,47,59	<i>D. propatula propatula</i> - 37
<i>B. patulus macrachantus</i> - 4	<i>D. propatula f. macrodactyla</i> - 37
<i>B. patulus patulus</i> - 4	<i>Dissothrocha aculeata</i> - 5,20,21,24,40,44,53,54,56,58
<i>B. quadridentatus</i> - 1,4,5,11,14,15,17,20,27,37,40,42,44,47,50,59	<i>D. macrostyla</i> - 58
<i>B. quadridentatus brevispinus</i> - 37	<i>Epiphanes brachionus</i> - 15,59
<i>B. quadridentatus quadridentatus</i> - 37	<i>E. clavulata</i> - 13,37
<i>B. quadridentatus melhni</i> - 37	<i>E. macrourus</i> - 6,12,16
<i>B. quadridentatus cluniorbicularis</i> - 37	<i>E. senta</i> - 14
<i>E. incisa</i> - 40,57,58	<i>E. deflexa</i> - 33
<i>E. meneta</i> - 37,48,58	<i>Euchlanis dilatata</i> - 2,10,13,26,32,37,40,41,57,58,59
<i>E. triquetra</i> - 5,16,20,21,24	<i>E. dilatata f. lucksiana</i> - 37
<i>Filinia camasecla</i> - 15,25,43	<i>L. aculeata</i> - 23,27,37
	<i>L. aguessei</i> - 37
	<i>L. arcuata</i> - 26,27,32,35
	<i>L. amazoniana</i> - 37

Table 1: Conti.

E. longiscia	- 1,4,10,15,17,18,20,26,27,32,33,35,40,41,42,46,49,50,55,59	L. bulla	- 5,6,7,8,12,19,20,21,22,24,37,38,40,41,42,43,51,52,53,54,55 56,57,58
E. opollensis	- 14,19,26,27,28,32,35,59	L. bulla bulla	- 15,26,27,32,35,59
E. saltator	- 10,26,27,35,37	L. clara	- 37,40
E. terminalis	- 2,13,19,32,33,35,37,38,44,47,59	L. closteroerca	- 5,15,23,26,27,32,35,37,40,53,58,59
Gastropus hytiopus	- 7,33,40,59	L. copeis	- 21,37
G. stylifer	- 27,35,37,49	L. cornuta	- 32,35,37,40
Harrigia eupoda	- 48	L. crepida	- 23,32,37,40
Hexarthra brasiliensis	- 27,35,49	L. curvicormis	- 4,5,20,35,37,40,43,56
H. intermedia	- 14,19,25,26,27,30,32,33,35,38,40,50,56,59	L. curvicormis loluana	- 37
H. intermedia brasiliensis	- 7,10,19,27,37,50	L. decipiens	- 32,37,40
H. intermedia intermedia	- 37	L. doryssa	- 15,32,37,40
H. longicomnicula	- 26,27,32,35,37,49	L. elegans	- 37,40,59
H. mira	- 37	L. elongata	- 37
Horaeia brehmi	- 59	L. elsa	- 8,37
H. thomassoni	- 5,27,33,37	L. flexilis	- 2,26,35,37,40
Kellicotia bostoniensis	- 17,26,27,31,32,35	L. furcata	- 26,27,32,35,37,40
K. longispina	- 27,30,33,34	L. furcata var elachis	- 37
Keratella americana	- 1,2,5,6,7,8,9,10,11,12,13,14,15,19,20,21,22,24,25 26,27,28,29,30,31,32,33,34,35,37,38,39,40,41,42 43,44,46,47,48,49,50,52,53,54,56,57,58,59	L. halicysta	- 13,15,26,37
K. americana hispida	- 37,50	L. hamata	- 23,26,27,35,37,40
K. cochlearis	- 1,5,6,7,8,9,10,11,12,13,14,15,16,17,19,20,21,22,24,25,26 27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,44,45 46,47,48,49,50,51,52,53,54,56,57,58,59	L. hastata	- 37
K. lenzi	- 1,5,7,10,13,15,16,19,22,24,26,27,29,31,32,35,37,38,40,45,48,49 50,52,54,56,57,59	L. homemanni	- 2,10,13,26,27,37,40
K. lenzi lenzi	- 48,50	L. imbricata	- 16,33
K. tropica	- 1,5,6,7,8,9,10,11,12,13,15,17,19,20,21,22,24,25,26,27,28 32,35,37,40,41,42,51,53,56,57,58,59	L. inermis	- 10,27,37,40
K. tropica tropica	- 27	L. inopinata	- 37
		L. inopinata sympoda	- 13,37
		L. lauteborni	- 37
		L. leontina	- 1,4,5,7,8,10,13,20,23,24,25,26,32,35,37,39,40,41,42,43,58,59
		L. levislyta	- 1,10,13,26,32,35,37
		L. llopeis	- 53

Table 1: Cont.

<i>L. tropica brehmi</i> - 37	<i>L. ludwigii</i> - 10,20,24,27,32,37,40,59
<i>K. valga</i> - 54	<i>L. ludwigii</i> f. <i>ludwigii</i> - 40
<i>K. tecta</i> - 37	<i>L. ludwigii marshi</i> - 13
<i>Lecane aquila</i> - 37	<i>L. ludwigii ohioensis</i> - 23
<i>L. acanthinula</i> - 35	<i>L. luna</i> - 5,6,8,15,16,17,19,20,22,23,24,27,32,37,48,51,54,56,57,58,59
<i>L. acronycha</i> - 37	<i>L. lunaris</i> - 5,8,14,15,16,20,21,24,25,26,27,32,34,35,37,39,40,44,47,50,53 54,57,58,59
<i>L. lunaris crenata</i> - 37	<i>L. rhomboides</i> - 23
<i>L. lunaris perplexa</i> - 27,37	<i>Limnias melicerta</i> - 37
<i>L. m archantaria</i> - 15	<i>Macrochaetus collinsi</i> - 1,48,55,56
<i>L. monostyla</i> - 15,17,25,35,37,40,44,47,57,59	<i>M. collinsi collinsi</i> - 37
<i>L. murrayi</i> - 47	<i>M. longipes</i> - 11,10,13,37,40
<i>L. nana</i> - 10	<i>M. sericus</i> - 1,4,15,16,19,20,26,27,35,37,40,49
<i>L. nitida</i> - 1,10,13	<i>M. eudactylosum</i> - 37
<i>L. nodosa</i> - 1	<i>M. maculata</i> - 1,10,13
<i>L. ohioensis</i> - 37	<i>Monostyla bulla</i> - 1,2,4,10,20
<i>L. papuana</i> - 2,4,10,13,27,20,37,40	<i>M. closteroerca</i> - 10,13
<i>L. proiecta</i> - 19,35	<i>M. cornuta</i> - 1,4,13,20
<i>L. pyriformis</i> - 23,26,27,32,37,40,58,59	<i>M. oidipus</i> - 10
<i>L. psammophilla</i> - 27	<i>M. crenata</i> - 10,13
<i>L. pusilla</i> - 37	<i>M. decipiens</i> - 1
<i>L. rutmeri</i> - 37	<i>M. furcata</i> - 10
<i>L. signifera</i> - 2,5,26,27,35,40	<i>M. hamata</i> - 10,13
<i>L. signifera ploenensis</i> - 37	<i>M. lunaris</i> - 10
<i>L. stenroosi</i> - 37,48,50,59	<i>M. lunaris perplexa</i> - 10
<i>L. stichaea</i> - 5,13,16,20,24,59	<i>M. monostyla</i> - 13
<i>L. stichaea stichaea</i> - 37	<i>M. quadridentata</i> - 1,10,13
<i>L. stichaea amazonica</i> - 37	<i>M. rugosa</i> - 10
<i>L. stichaea intranusiata</i> - 37	<i>M. scutata</i> - 4,10,20
<i>L. stichaeoides</i> - 2,13	<i>M. trigona</i> - 4,20

Table 1: cont.

<i>L. subtilis</i> - 15	<i>M. unguipes</i> - 4,20
<i>L. scutata</i> - 27,37,40,49	<i>M. wulferti</i> - 10,13
<i>L. sylvatica</i> - 37	<i>Mytilina acanthophora</i> - 1,37,40
<i>L. tenuiseta</i> - 37	<i>M. bisulcata</i> - 37,40,54,59
<i>L. quadridentata</i> - 5,20,23,32,37,40,53	<i>M. mucronata mucronata</i> - 37
<i>L. uenoi</i> - 40	<i>M. trigona</i> - 37
<i>L. unguata</i> - 4,20,21,37	<i>M. ventralis</i> - 13,19,37,40
<i>L. venusta</i> - 37	<i>M. ventralis macracantha</i> - 37
<i>L. wulferti</i> - 37	<i>M. unguipes</i> - 23,37
<i>Lepadella acuminata</i> - 13,15,16,32,37	<i>Paracolarella logima</i> - 16
<i>L. cristata</i> - 5,20,24,40,57	<i>Playas leloupi laticapularis</i> - 4,37,40
<i>L. christinei</i> - 37	<i>P. leloupi leloupi</i> - 37
<i>L. dactyliseta</i> - 10	<i>P. patulus</i> - 40
<i>L. latusinus</i> - 26,40	<i>P. quadricornis</i> - 15,16,19,25,26,27,37,40,50,56,57,59
<i>L. ovalis</i> - 13,16,24,40,58,59	<i>P. quadricornis brevispinus</i> - 23,27,35,37
<i>L. patella</i> - 5,10,15,16,23,26,27,33,34,35,37,40,49,50,54,57,59	<i>Pleosoma lenticulare</i> - 30,33
<i>L. patella similis</i> - 37	<i>P. truncatum</i> - 26,27,32,35,37
<i>Polyarthra dolychoptera</i> - 5,6,8,9,12,13,22,30,36,40,48,50,54,57	<i>T. cylindrica chattoni</i> - 14,19,29,31
<i>P. remata</i> - 15,19,36,48,50	<i>T. dixon-tuttalli</i> - 37
<i>P. vulgaris</i> - 2,4,10,13,14,16,17,20,26,27,28,32,36,37,48,50,59	<i>T. elongata</i> - 35
<i>P. vulgaris longiremis</i> - 50	<i>T. elongata brasiliensis</i> - 15,30,33,37
<i>Pompholyx complanata</i> - 27,32,35,37	<i>T. fusiformis</i> - 16,40,59
<i>P. sulcata</i> - 7	<i>T. flagellata</i> - 40
<i>Plygura libera</i> - 19,26,27,30,32,33,35,37,49,59	<i>T. gracilis</i> - 27,35,37
<i>P. melicerta</i> - 19,26,27,32,35,37	<i>T. inermis</i> - 37,40
<i>P. melicerta socialis</i> - 37	<i>T. insignis</i> - 10,13,20,24,32,37,59
<i>Rotaria neptunia</i> - 37,59	<i>T. longiseta</i> - 59
<i>R. rotatoria</i> - 57,59	<i>T. multicornis</i> - 32,59
<i>Scaridium longicaudum</i> - 27,37,59	<i>T. myersi</i> - 37
<i>Sinantherina semibullata</i> - 37	<i>T. ornata</i> - 59

Table 1: Cont.

<i>Trichocerca bicristata</i>	- 40,5,59,27,37	<i>T. similis grandis</i>	- 52
<i>T. bidens</i>	- 26,37	<i>T. similis similis</i>	- 32,37
<i>T. brasiliensis</i>	- 4	<i>T. tenuior</i>	- 40
<i>T. carinata</i>	- 33	<i>T. terminalis</i>	- 14
<i>T. capucina</i>	- 7,10,13,19,24,26,27,35,37	<i>T. tetractis</i>	- 40
<i>T. capucina multicrinis</i>	- 37	<i>T. tigris</i>	- 37,48
<i>T. cavia</i>	- 15,27	<i>T. voluta</i>	- 37
<i>T. chattoni</i>	- 19,26,27,32,35,37,49	<i>T. stylata</i>	- 26,27,32,37,40,41,45,49,50
<i>T. collaris</i>	- 16, 37	<i>Trichotria tenuior</i>	- 22,23,26,27,37,59
<i>T. cylindrica</i>	- 8,14,16,24	<i>T. tetractis</i>	- 7,10,15,25,26,33,40,59
<i>T. cylindrica chattoni</i>	- 14,19,29,31	Cladocera	
<i>T. dixon-nuttalli</i>	- 37	<i>Acropenus harpae</i>	- 20,21,24
<i>T. elongata</i>	- 35	<i>Alona cambouei</i>	- 40
<i>T. elongata brasiliensis</i>	- 15,30,33,37	<i>A. costata</i>	- 5,47,53,56
<i>T. fusiformis</i>	- 16,40,59	<i>A. guttata</i>	- 5,9,19,20,21,24,40,44,47,53,54,56,57
<i>T. flagellata</i>	- 40	<i>A. intermedia</i>	- 21,24,53
<i>T. gracilis</i>	- 27,35,37	<i>A. monacantha</i>	- 40
<i>T. inermis</i>	- 37,40	<i>A. poppei</i>	- 40
<i>T. insignis</i>	- 10,13,20,24,32,37,59	<i>A. quadrangularis</i>	- 8
<i>T. longiseia</i>	- 59	<i>A. rectangula</i>	- 8,20,21,29,31,38,53,54,57
<i>T. multicrinis</i>	- 32,59	<i>Alonella dadayi</i>	- 47
<i>T. myersi</i>	- 37	<i>A. dentifera</i>	- 25,40
<i>T. ornata</i>	- 59	<i>A. excisa</i>	- 20,58
<i>T. porcellus</i>	- 5,59	<i>Biapertura intermedia</i>	- 40,52,54,57,58
<i>T. pusilla</i>	- 5,7,8,11,12,14,19,21,22,26,27,30,32,37,40,41,42,43,48,49,50 57,59	<i>B. kartua</i>	- 40
<i>T. raitus</i>	- 11,12,14,30,33	<i>Bosmina coregoni</i>	- 59
<i>T. rutneri</i>	- 59	<i>B. hagemanni</i>	- 13,15,19,25,26,27,30,32,33,35,37,40,41,42,43,45,46,49,54 57,59
<i>T. scipio</i>	- 40	<i>B. longirostris</i>	- 17,18,19,26,27,30,32,33,35,37,59
<i>T. similis</i>	- 2,4,5,7,8,10,13,14,19,20,21,24,26,27,30,33,35,37,40,41,42,49 50,53,57,59	<i>B. longiseia</i>	- 33
		<i>B. tubicen</i>	- 6,8,11,19,25,28,39,40,41,42,43,46,54,57

Table 1: Cont.

A. excisa - 20,58	E. occidentalis - 37
Biapertura intermedia - 40,52,54,57,58	Graptoleberis testudinaria - 20
B. karua - 40	Grimadilna brazzai - 5,40
Bosmina coregoni - 59	Ilyocryptus sordidus - 20,48
B. hagmanni - 13,15,19,25,26,27,30,32,33,35,37,40,41,42,43,45,46,49,54,57,59	I. spinifer - 5,10,13,19,30,37,40,54,57
B. longirostris - 17,18,19,26,27,30,32,33,35,37,59	Latonopsis australis - 30
B. longiseta - 33	Leydiga ciliata - 19
B. tubicen - 6,8,11,19,25,28,39,40,41,42,43,46,54,57	L. ipojucae - 54
Bosminopsis deitersi - 7,10,13,19,20,21,24,25,26,27,28,30,31,32,33,35,37,38,41,42,43,48,49,50,53,54,56,57,59	Macrothrix elegans - 40
Ceriodaphnia comuta - 12,14,15,17,18,19,24,25,26,27,28,29,30,31,32,35,38,40,41,42,44,46,47,49,50,52,54,56,59	M. flabelligera - 37
C. comuta comuta - 19	M. laticornis - 5,40,41,44,47,54
C. comuta rigaudi - 30,19	Moina micrura - 6,8,12,35,31,32,56,57
C. dubia - 59	M. minuta - 6,7,14,19,25,26,27,28,30,32,33,35,37,40,42,49,50,54,56,57,59
C. quadrangula - 26	M. reticulata - 40
C. richardi - 14,26,27,32,35,49	Pseudosida bidentata - 40
C. reticulata - 35	P. ramosa - 40
C. silvestri - 19,40,54	Scapholeberis armata - 42
Chydoridae - 5,8,20,21,24,26,32,37,54	S. mucronata - 35
Chydorus eurynotus - 40,41,42	S. serrulatus - 27,35,57
C. globosus - 55	Strebocerus pygmaeus - 5
C. sphaericus - 40	Copepoda
Dadaya macrops - 40	Allocyclops neotropicalis - 37
Daphnia ambigua - 57	Argyrodiaptomus furcatus - 26,27,30,31,32,35,37,38,42,44,47,51,57,59
D. dubia - 25	Diaptomus minutus - 25,59
D. galeata - 25,59	Haplocyclops torresi - 54
D. gessneri - 14,18,19,25,26,27,28,30,32,33,35,37,40,42,49,50,56,59	Harpacticoida - 40, 19
D. laevis - 14,18,19,25,40,43,45	Mesocyclops brasiliianus - 19
	M. edax - 59
	M. longisetus - 14,19,25,26,27,28,35,42,45,54,57
	M. longisetus longisetus - 37

<i>M. longisetus longisetus</i>	- 37
<i>M. meridianus</i>	- 40,49
<i>M. ogunnus</i>	- 31
<i>Metacyclops mendocinus</i>	- 48,50,56,58
<i>Microcyclus anceps</i>	- 40,41,42,43
<i>M. ceibaensis</i>	- 40
<i>M. finitimus</i>	- 37
<i>Neutrocyclops brevifurca</i>	- 40
<i>Notodiaptomus conifer</i>	- 25,28,57
<i>N. deitersi</i>	- 27
<i>N. iheringi</i>	- 14,25,26,27,28,31,32,33,35,37,40,41,42,43,45,46,59
<i>N. isabellae</i>	- 19,42
<i>N. nordstinus</i>	- 14,25,26,27,28,32,35
<i>N. spinuliferus</i>	- 19
<i>Paracyclops fimbriatus</i>	- 19,22,32,40,42,54,56,57,58
<i>Potamocaris estevesi</i>	- 54
<i>Scolodiaptomus corderoi</i>	- 14,18,25,27,28,31,32,37,38,42,49,50,51,56,57
<i>Thermocyclops crassus</i>	- 22,54,58,57
<i>T. decipiens</i>	- 11,12,14,18,19,25,26,27,31,32,37,49,50
<i>T. minutus</i>	- 2,4,7,9,11,14,15,17,19,20,22,25,26,27,28,30,31,32,33,35,37 38,39,40,41,42,43,45,46,49,50,51,54,56,57,58,59
<i>Trichodiaptomus coronatus</i>	- 10, 37
<i>Tropocyclops prasinus</i>	- 42, 56
Chaoborus	
<i>Chaoborus braziliensis</i>	- 17
<i>C. magnificus</i>	- 41

the basins of the Pardo, Jequitinhonha, Paraíba do Sul and Paranaíba Rivers. These basins shown a significant regional demand in the consumption of hydric resources associated to many different impacting anthropic activities that certainly can affect the water quality and consequently the whole assortment of zooplanktonic species. Thus, initiatives aimed at surveying aquatic systems of these basins constitute a fundamental prerogative in the equalization of the regional knowledge on the zooplanktonic biodiversity.

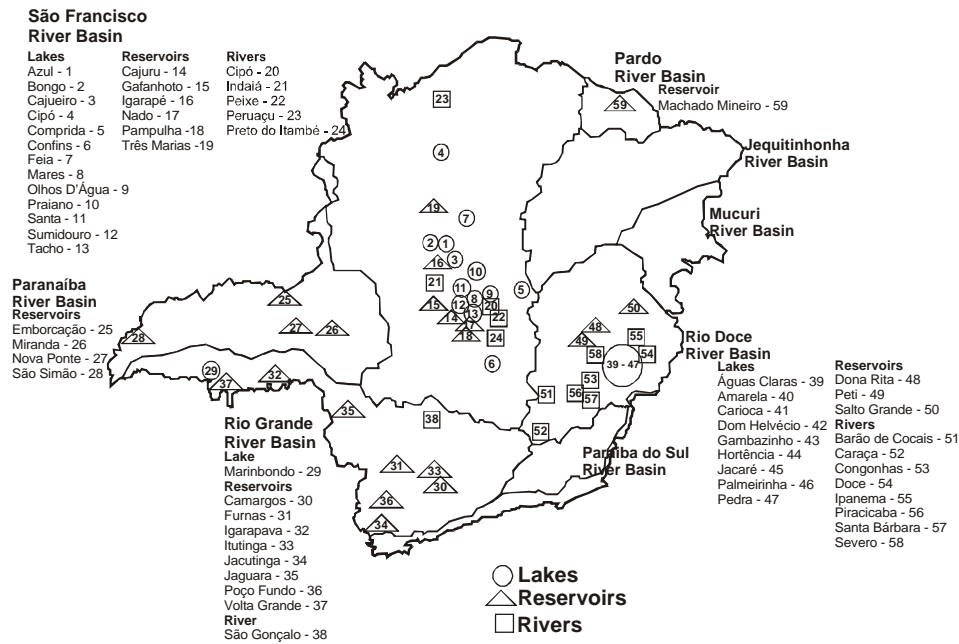


Figure 1: Studied environments at major hydrographic basins of Minas Gerais State, according with the present synthesis.

Estimates of zooplanktonic species richness for several of the aquatic ecosystems of Minas Gerais, shown in Fig. 2, allowed to identify environments with an expressive number of species recorded so far (e.g. Lagoa Amarela with 158 taxa, Praiano Lake, 68 species, Volta Grande Reservoir with 218, and Cipó River, 76 species) and others with a much lower number, such as the Lakes Águas Claras and Marimbondo (06 and 09 species respectively), the reservoir Poço Fundo (05 species) and Ipanema stream (07 species). (Fig. 3).

This unevenness may reflect both the need of more detailed studies in some of these environments (higher number of samplings, or concentrated samplings in more representative seasonal periods), and in the state of knowledge of some taxa, particularly Protozooplankton not contemplated in various of the consulted studies. This group was hardly considered even in those environments in which historical series of limnological information for over 20 years, such as Dom Helvécio and Carioca Lakes and the Pampulha and Furnas reservoirs. This is partly due to the need of methodological adequacy for collecting these organisms and to the reduced number of specialists in taxonomy as has been pointed out for other aquatic invertebrate groups (Ismael et al., 1999). Absence of projects and initiatives specifically devoted to a deeper understanding of protoplankton in Minas Gerais also contributed to the identified absence of taxonomic knowledge of protoplankton species. According to Rocha (2002) the lack of information about the diversity of

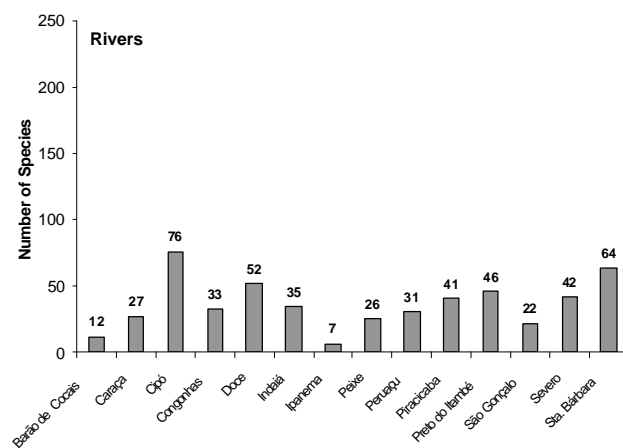
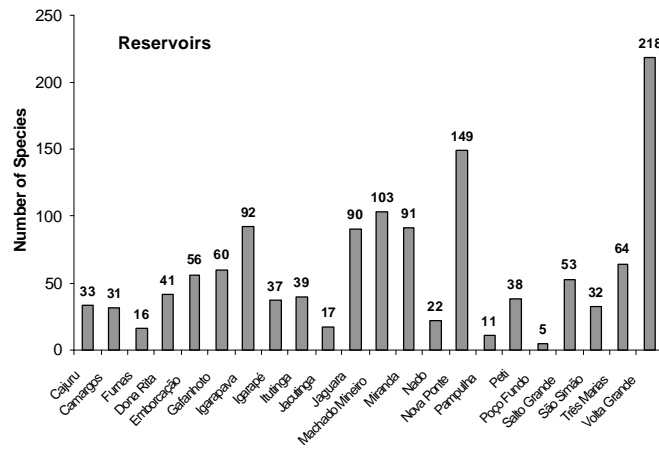
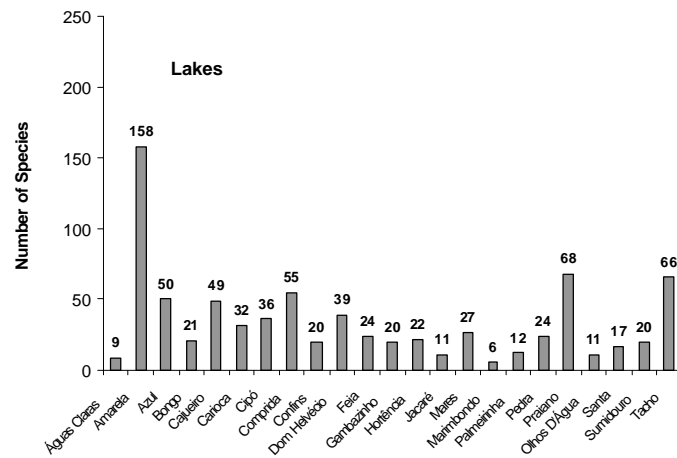


Figure 2: Total number of zooplanktonic taxa related to aquatic ecosystems in Minas Gerais State.

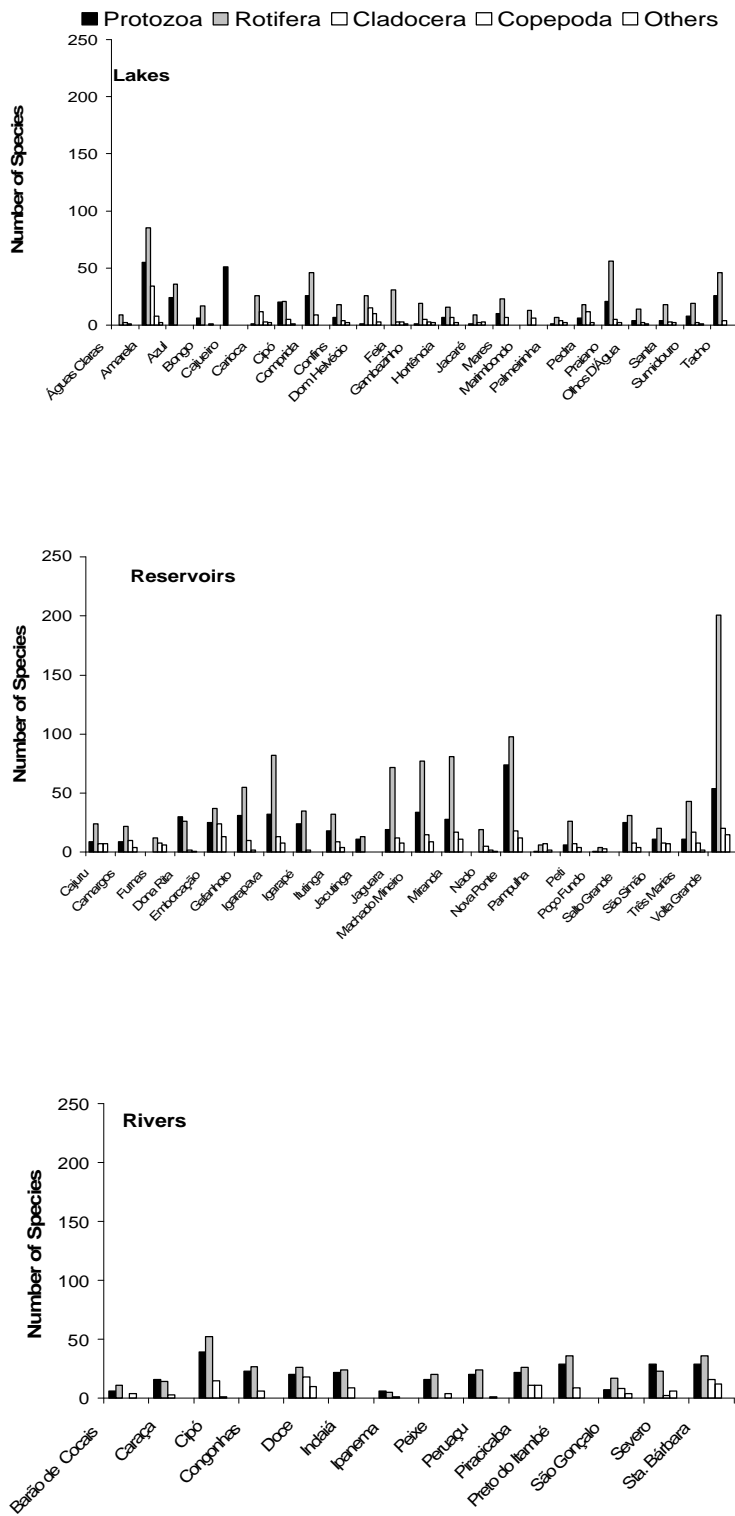


Figure 3: Number of taxa per zooplanktonic group.

protoplankton for Brazilian freshwaters makes it enormously difficult to globally evaluate the total number of species and genera known, despite the great importance of these organisms for basic scientific investigation.

Another consideration to be taken into account is about the present state of knowledge on the diversity of Copepoda species. Although Calanoida and Cyclopoida copepods of some areas are relatively well inventoried very few studies list Harpacticoida copepod species, a group with occasional species found in the plankton (Suárez-Morales et al., 1996). This group is traditionally neglected in inventories and sampling strategies of research projects. In addition there is also a lack of taxonomists dedicated to the study of this group.

Overall, a greater inventory effort has been taken towards lentic ecosystems, while not much attention has been devoted for the knowledge on zooplankton of rivers and marginal lakes (Dabés & Velho, 2001).

As a whole, the present synthesis shows a very heterogeneous level of knowledge on zooplanktonic biodiversity in the aquatic ecosystems of Minas Gerais. Under these circumstances future investigation strategies should contemplate environments and regions not well studied yet, such as the fluvial and lentic systems of the hydrographic basins of the Pardo, Jequitinhonha, Paraíba do Sul and Paranaíba Rivers as well as to advance the zooplankton taxonomic inventory of the ecosystem located at the more studied hydrographic basins (São Francisco, Doce e Grande). A greater effort should also guide future investigative initiatives as for inventory of planktonic groups whose database is very limited, which are extremely relevant for broader and more consistent picture about zooplanktonic biodiversity of the aquatic ecosystems in Minas Gerais.

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