



An updated checklist of helminth and protozoan parasites of birds in New Zealand

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Article ID: WMC00705

Article Type: Original Articles

Submitted on: 26-Sep-2010, 07:33:03 PM GMT **Published on:** 27-Sep-2010, 07:17:49 AM GMT

Article URL: http://www.webmedcentral.com/article_view/705

Subject Categories: PARASITOLOGY

Keywords: Nematoda, Cestoda, Trematoda, Acanthocephala, Protozoa, bird, checklist, bibliography, New Zealand

How to cite the article: McKenna P . An updated checklist of helminth and protozoan parasites of birds in New Zealand . WebmedCentral PARASITOLOGY 2010;1(9):WMC00705

Source(s) of Funding:

N/A

Competing Interests:

N/A

An updated checklist of helminth and protozoan parasites of birds in New Zealand

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Abstract

A combined and updated checklist of helminth and protozoan parasites of birds in New Zealand is provided. This checklist, which is divided into two parts, includes a total of 203 parasites (68 nematodes, 40 cestodes, 44 trematodes, 11 acanthocephalans and 40 protozoans) from 116 hosts.

Introduction

Since publication of checklist of helminth and protozoan parasites of birds in New Zealand over 10 years ago [1], there have been a number of new records. This update includes these additional records and allows for the correction of those errors and omissions that were present in the preceding version. In the main, the taxonomic names assigned to those parasites recorded in the previous checklist have been kept in the present list also. Thus, the generic name *Capillaria* continues to be used in its widest sense despite such revisions as those suggested by Moravec [2] in which some *Capillaria* species were retained in this genus while others were provisionally reassigned to a number of different genera including *Eucoleus* (*Capillaria annulata*, *Capillaria contorta*, *Capillaria perforans*), *Baruscapillaria* (*Capillaria emberizae*, *Capillaria obsignata*), or *Aonchotheca* (*Capillaria caudinflata*). In contrast, the generic nematode names of *Stomachus* and *Filicapsularia*, which are lapsed names [3], have been replaced by *Contraecaecum* and *Anisakis*, respectively. Likewise, the generic protozoan name *Spironucleus* is used rather than *Hexamita* as suggested by Levine [4] and the apparent spelling error of *Eimeria kovoidi* recorded by Williams [5] has been corrected to *Eimeria kofoidi* [6]. As well, the acanthocephalan parasite recorded in the pied stilt as *Polymorphus* sp. by McDonald [7] has been changed to *Profilicollis* sp. following the proposal of Nickol [8]. Finally, some of the formerly used bird names have also been modified and now more generally conform to those in Avibase [9].

As in the previous publication, the checklist is divided into two parts. In both parts, and where applicable, the parasite listings are divided into the major groups of Nematoda, Cestoda, Trematoda, Acanthocephala and

Protozoa. In the first part the parasites are listed alphabetically under the common name of the host and in the second they are listed alphabetically according to parasite. To try to make it easier to find a particular host and to attempt to ensure that similar type hosts are generally grouped together, in Part I the common host names are presented as "Duck, mallard" or "Penguin, blue" rather than the more conventional "Mallard duck" or "Blue penguin" format used in the second part of the document. In addition and for similar reasons, the Paradise shelduck is simply referred to as Paradise duck.

In keeping with the previous version of this checklist, only those parasites identified to at least generic level have been included. Each parasite record in Part I is supported by a reference (although not necessarily the first New Zealand record), whereas such citations are omitted from Part 2. Parasites considered to be of uncertain or questionable identity are indicated by a question mark while all new parasite records or new host-parasite links representing additions to those provided in the previous checklist [1], are accompanied by the symbol †.

Acknowledgements

Work carried out in gathering information for this paper was supported by MAF Biosecurity New Zealand.

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Illustrations

Illustration 1

PART 1: PARASITE LIST BY HOST

Albatross, black-browed (<i>Thalassarche melanophrys</i>)	Nematoda	<i>Anisakis</i> sp.?	[10]
		<i>Contracaecum scotti</i>	[10]
Albatross, light-mantled sooty (<i>Phoebastria palpebrata</i>)	Nematoda	<i>Contracaecum diomedae</i>	[10]
Albatross, royal (<i>Diomedea epomophora</i>)	Nematoda	<i>Contracaecum diomedae</i>	[10]
	Protozoa	<i>Hepatozoon albatrossi</i> †	[11]
Albatross, shy (<i>Thalassarche cauta</i>)	Nematoda	<i>Contracaecum diomedae</i>	[10]
Bellbird (<i>Anthornis melanura melanura</i>)†	Protozoa	<i>Plasmodium</i> sp.†	[12]
Bittern, Australasian (<i>Botaurus poiciloptilus</i>)	Nematoda	<i>Eustrongylides</i> sp.	[10]
	Trematoda	<i>Echinoparyphium recurvatum</i>	[13]
Blackbird (<i>Turdus merula</i>)	Nematoda	<i>Capillaria</i> sp.	[10]
		<i>Porrocaecum ensicaudatum</i>	[14]
		<i>Syngamus trachea</i>	[10]
	Cestoda	<i>Anomotaenia verulamii</i>	[15]
		<i>Aploparaksis dujardinii</i>	[15]
		<i>Dilepis undula</i>	[15]
		<i>Hymenolepis serpentulus</i>	[15]
	Protozoa	<i>Giardia</i> sp.	[16]
		<i>Haemoproteus danilewsky</i>	[17]
		<i>Isospora turdi</i> †	[18]
	<i>Plasmodium relictum</i>	[17]	

Conure, sun (<i>Aratinga solstitialis</i>)†	Nematoda	<i>Capillaria</i> sp.†	[24]	
Cuckoo, shining (<i>Chrysococcyx lucidus</i>)	Nematoda	<i>Ascaridia zelandica</i>	[25]	
		<i>Microtetrameres</i> sp.	[25]	
Dotterel, New Zealand (<i>Charadrius obscurus</i>)	Acanthocephala	<i>Plagiorhynchus</i> sp.†	[26]	
	Protozoa	<i>Plasmodium elongatum</i>	[27]	
		<i>Plasmodium relictum</i>	[27]	
Duck, blue (<i>Hymenolaimus malacorhynchus</i>)†	Nematoda	<i>Capillaria</i> sp.†	[24]	
	Cestoda	<i>Sobolevicanthus</i> sp.†	[28]	
Duck, grey (<i>Anas superciliosa superciliosa</i>)	Nematoda	<i>Amidostomum acutum</i> †	[29]	
		<i>Capillaria anatis</i> †	[29]	
		<i>Contracecum microcephalum</i>	[30]	
		<i>Echinuria australis</i>	[31]	
		<i>Echinuria uncinata</i>	[31]	
		<i>Epomidiostomum uncinatum</i> †	[29]	
		<i>Tetrameres</i> sp.†	[29]	
		Cestoda	<i>Anomotaenia ciliata</i> †	[29]
			<i>Aploparaksis furcigera</i> †	[29]
			<i>Dicranotaenia coronula</i> †	[32]
	<i>Diorchis flavescens</i> †		[29]	
	<i>Diorchis inflata</i> †		[32]	
	<i>Fimbriaria fasciolaris</i> †		[29]	
	<i>Gastrotaenia cygni</i> †		[29]	
	<i>Hymenolepis megalops</i>		[10]	
	<i>Sobolevicanthus gracilis</i> †		[29]	
	Trematoda		<i>Catatropis</i> sp.†	[29]
		<i>Cotylurus cornutus</i> †	[29]	
		<i>Dendritobilharzia pulverulenta</i>	[10]	
		<i>Echinostoma revolutum</i> †	[29]	

	Trematoda	<i>Gastrotaenia cygni</i> †	[29]
		<i>Hymenolepis megalops</i> †	[29]
		<i>Catatropis</i> sp.†	[29]
		<i>Dendritobilharzia pulverulenta</i>	[10]
		<i>Echinostoma revolutum</i> †	[29]
		<i>Psilotrema</i> sp.†	[29]
		<i>Trichobilharzia</i> sp.	[10]
Duck, muscovy (<i>Cairina moschata</i>)	Trematoda	<i>Dendritobilharzia pulverulenta</i>	[34]
Duck, paradise (<i>Tadorna variegata</i>)	Nematoda	<i>Amidostomum acutum</i>	[35]
		<i>Capillaria anatis</i>	[35]
		<i>Epomidiostomum uncinatum</i> †	[29]
		<i>Porrocaecum crassum</i>	[35]
		<i>Tetrameres</i> sp.†	[29]
		<i>Trichostrongylus tenuis</i>	[35]
	Cestoda	<i>Anomotaenia ciliata</i> †	[29]
		<i>Aploparaksis furciger</i> †	[29]
		<i>Fimbriaria fasciolaris</i>	[35]
		<i>Hymenolepis megalops</i>	[10]
		<i>Sobolevicanthus gracilis</i> †	[29]
	Trematoda	<i>Catatropis</i> sp.	[13]
		<i>Cotylurus cornutus</i>	[35]
		<i>Dendritobilharzia pulverulenta</i>	[36]
		<i>Echinoparyphium recurvatum</i>	[13]
		<i>Echinostoma revolutum</i>	[13]
		<i>Echinostoma</i> sp.†	[35]
		<i>Hypoderaeum conoideum</i> †	[29]
		<i>Notocotylus attenuatus</i>	[35]
		<i>Notocotylus gippyensis</i>	[13]
		<i>Notocotylus tadornae</i>	[33]
		<i>Typhlocoelum cucumerinum</i> †	[29]
Duck, "wild" (<i>Anas spp.</i>)	Cestoda	<i>Sobolevicanthus</i> sp.†	[32]
<i>Webmedcentral > Original Articles</i>	Trematoda	<i>Catatropis</i> sp.	[13]
		<i>Cotylurus</i> sp.?	[13]
		<i>Dendritobilharzia pulverulenta</i>	[10]
		<i>Echinoparyphium recurvatum</i>	[13]

Emu (<i>Dromaius novaehollandiae</i>)†	Nematoda	<i>Dromaeostrongylus bicuspid</i> † <i>Trichostrongylus tenuis</i> †	[38] [38]
Falcon, New Zealand (<i>Falco novaeseelandiae</i>)†	Nematoda	<i>Serratospiculum guttatum</i> †	[39]
Fantail (<i>Rhipidura fuliginosa</i>)†	Protozoa	<i>Plasmodium</i> sp.†	[12]
Finch (<i>Fringillidae</i> ?)	Protozoa	<i>Atoxoplasma</i> sp. <i>Plasmodium cathemerium</i>	[40] [20]
Finch, cordon-bleu (<i>Uraeginthus bengalus</i>)	Nematoda	<i>Acuaria skrjabini</i>	[41]
Finch, parson (<i>Peophila cincta</i>)	Nematoda	<i>Syngamus trachea</i>	[10]
Finch, pictorella (<i>Heteromunia pectoralis</i>)	Nematoda	<i>Syngamus trachea</i>	[10]
Fowl, domestic (<i>Gallus gallus domesticus</i>)	Nematoda	<i>Ascaridia galli</i> <i>Capillaria annulata</i> <i>Capillaria caudinflata</i> <i>Capillaria obsignata</i> <i>Heterakis gallinarum</i> <i>Heterakis vesicularis</i> ?	[10] [42] [42] [42] [10] [10]
	Cestoda	<i>Syngamus trachea</i> <i>Davainea proglottina</i> <i>Echinolepis carioca</i> <i>Raillietina cesticillus</i>	[10] [10] [10] [10]
	Protozoa	<i>Cryptosporidium</i> sp.† <i>Eimeria acervulina</i> <i>Eimeria brunetti</i> <i>Eimeria maxima</i> <i>Eimeria necatrix</i> <i>Eimeria tenella</i> <i>Histomonas meleagridis</i> <i>Toxoplasma gondii</i>	[43] [44] [44] [44] [44] [44] [45] [46]

Godwit (<i>Limosa</i> sp.)	Trematoda	<i>Ornithobilharzia kowalewskii</i>	[34]
Godwit, bar-tailed (<i>Limosa lapponica</i>)†	Acanthocephala	<i>Profilicollis antarcticus</i> † <i>Profilicollis novaezelandensis</i> †	[51] [51]
Godwit, eastern bar-tailed (<i>Limosa lapponica baueri</i>)†	Cestoda	<i>Capsulata edenensis</i> † <i>Ophryocotyle proteus</i> †	[52] [52]
	Trematoda	<i>Acanthoparyphium spinulosum</i> † <i>Curtuteria australis</i> † <i>Himasthla leptosoma</i> † <i>Maritrema gratiosum</i> † <i>Parorchis acanthus</i> † <i>Wardianum taxorchis</i> †	[52] [52] [52] [52] [52] [52]
Goose, Canada (<i>Branta canadensis</i>)	Nematoda	<i>Amidostomum anseris</i> † <i>Trichostrongylus tenuis</i> †	[29] [29]
	Trematoda	<i>Cotylurus cornutus</i> † <i>Echinoparyphium recurvatum</i> <i>Echinostoma revolutum</i> <i>Notocotylus attenuatus</i> † <i>Notocotylus gippyensis</i>	[29] [13] [13] [29] [33]
Goose, domestic (<i>Anser anser</i>)	Nematoda	<i>Amidostomum anseris</i> † <i>Capillaria anatis</i> † <i>Heterakis gallinarum</i> † <i>Trichostrongylus tenuis</i> †	[11] [11] [11] [11]
	Trematoda	<i>Echinoparyphium recurvatum</i> <i>Echinostoma revolutum</i> <i>Notocotylus gippyensis</i> <i>Notocotylus tadornae</i>	[13] [13] [13] [33]
Greenfinch (<i>Carduelis chloris</i>)	Protozoa	<i>Atoxoplasma</i> sp. <i>Isospora</i> sp.? <i>Plasmodium relictum</i> †	[53] [53] [22]

		<i>Echinoparyphium recurvatum</i> †	[56]
		<i>Maritrema novaezelandensis</i> †	[56]
		<i>Parorchis acanthus</i>	[59]
	Acanthocephala	<i>Arhythmorhynchus</i> sp.†	[24]
		<i>Profilicollis novaezelandensis</i> †	[56]
Gull, southern black-backed (<i>Larus dominicanus</i>)			
	Nematoda	<i>Cosmocephalus tanakai</i>	[60]
		<i>Sciadiocara tarapunga</i> †	[61]
	Cestoda	<i>Cladogynia latovarium</i> †	[61]
		<i>Hymenolepis alaskensis</i> †	[61]
	Trematoda	<i>Echinoparyphium recurvatum</i> †	[61]
		<i>Echinostoma revolutum</i> †	[61]
		<i>Ornithobilharzia canaliculata</i>	[62]
		<i>Parorchis acanthus</i> †	[61]
		<i>Philophthalmus</i> sp.	[63]
	Acanthocephala	<i>Profilicollis antarcticus</i> †	[61]
		<i>Profilicollis novaezelandensis</i> †	[61]
Harrier, Australasian (<i>Circus approximans gouldi</i>)†			
	Nematoda	<i>Capillaria</i> sp.†	[64]
Kaka (<i>Nestor meridionalis</i>)			
	Nematoda	<i>Capillaria</i> sp.†	[65]
		<i>Microtetrameres nestoris</i>	[66]
		<i>Oxyspirura</i> sp.†	[67]
		<i>Syngamus trachea</i> †	[65]
	Protozoa	<i>Atoxoplasma</i> sp.†	[68]
		<i>Giardia</i> sp.	[69]
		<i>Toxoplasma gondii</i> ?	[70]
Kakapo (<i>Strigops habroptila</i>)			
	Nematoda	<i>Capillaria</i> sp.†	McKenna unpubl.
	Cestoda	<i>Stringopotaenia psittacea</i>	[10]
		<i>Eimeria</i> sp.†	McKenna unpubl.
	Protozoa		

Kiwi, brown (<i>Apteryx australis</i>)	Nematoda	<i>Ascaris apterycis?</i>	[10]
		<i>Cyrnea (Cyrnea) apterycis</i>	[10]
		<i>Heterakis gracilicauda</i>	[10]
		<i>Porrocaecum</i> sp.	[78]
		<i>Toxocara cati</i>	[78]
	Cestoda	<i>Anomotaenia minuta</i>	[10]
		<i>Davainea</i> sp.	[10]
		<i>Paricterotaenia apterygis?</i>	[10]
		<i>Raillietina</i> sp.	[10]
	Trematoda	<i>Taenia apterycis?</i>	[10]
	Acanthocephala	<i>Lyperosomum megacotylosum</i>	[79]
	Protozoa	<i>Echinorhynchus</i> sp.?	[10]
		<i>Babesia kiwiensis</i> †	[80]
<i>Eimeria</i> sp.		[81]	
	<i>Hepatozoon kiwi</i> †	[80]	
	<i>Plasmodium</i> sp.†	[82]	
Kiwi, little spotted (<i>Apteryx owenii</i>)	Protozoa	<i>Toxoplasma gondii?</i>	[83]
Kokako (<i>Callaeas cinereus</i>)†	Nematoda	<i>Capillaria</i> sp.†	[11]
	Protozoa	<i>Isospora</i> sp.?†	[28]
Lovebird (<i>Agapornis</i> sp.)	Protozoa	<i>Cryptosporidium</i> sp.	[84]
Lovebird, masked (<i>Agapornis personatus</i>)	Nematoda	<i>Ascaridia platycerci</i>	[85]
		<i>Capillaria</i> sp.	[10]
Lovebird, peach-faced (<i>Agapornis roseicollis</i>)	Nematoda	<i>Ascaridia</i> sp.	[10]
Magpie, Australian (<i>Gymnorhina tibicen</i>)†	Protozoa	<i>Plasmodium</i> sp.†	[12]

Morepork

(*Ninox novaeseelandiae*
novaeseelandiae)

Nematoda	<i>Capillaria</i> sp.†	[10]
	<i>Capillaria strigis</i>	[48]

"Oystercatcher" (<i>Haematopus</i> sp.)†	Trematoda	<i>Meiogymnophallus</i> sp.†	[88]	
Oystercatcher, South Island pied (<i>Haematopus finschi</i>)	Nematoda	<i>Viktorocara torea</i>	[57]	
	Cestoda	<i>Cladogynia latovarium</i> †	[32]	
		<i>Dicranotaenia clandestina</i> †	[32]	
		<i>Hymenolepis alaskensis</i>	[89]	
		<i>Nadejdolepis laurie</i> †	[32]	
		<i>Ophryocotyle proteus</i> †	[32]	
		<i>Proterogynotaenia dougi</i> †	[32]	
		<i>Proterogynotaenia haematopodis</i>	[89]	
		Trematoda	<i>Acanthoparyphium</i> sp.	[89]
		<i>Cloacitrema</i> sp.†	[89]	
		<i>Curtuteria australis</i>	[90]	
	<i>Maritrema gratiosum</i> †	[91]		
	<i>Notocotylus</i> sp.	[89]		
	<i>Parorchis acanthus</i> †	[91]		
Acanthocephala	<i>Plagiorhynchus allisonae</i> †	[92]		
<i>Profilicollis antarcticus</i> †	[51]			
<i>Profilicollis novaezealandensis</i> †	[51]			
Oystercatcher, variable (<i>Haematopus unicolor</i>)	Cestoda	<i>Hymenolepis alaskensis</i>	[89]	
		<i>Nadejdolepis laurie</i> †	[91]	
		<i>Taenia increescens?</i>	[10]	
	Trematoda	<i>Cloacitrema</i> sp.	[89]	
		<i>Curtuteria australis</i> †	[91]	
		<i>Notocotylus</i> sp.†	[91]	
		<i>Pittacium pittacium</i> †	[91]	
Acanthocephala	<i>Plagiorhynchus allisonae</i> †	[92]		
Parakeet (<i>Cyanoramphus</i> sp.)	Nematoda	<i>Ascaridia</i> sp.	[10]	
	Parakeet, Chatham Island red-crowned (<i>Cyanoramphus novaezealandiae</i> Chathamensis)	Nematoda	<i>Ascaridia platycerci</i>	[93]
Parakeet, red-fronted (<i>Cyanoramphus novaezealandiae</i>)				

Partridge, chukor (<i>Alectoris chukar</i>)	Nematoda	<i>Capillaria</i> sp.	[10]
		<i>Syngamus trachea</i>	[97]
	Cestoda	<i>Raillietina graeca</i>	[5]
	Protozoa	<i>Eimeria kofoidi</i>	[5]
Partridge, grey (<i>Perdix perdix perdix</i>)	Nematoda	<i>Capillaria cadovulvata</i>	[10]
		<i>Capillaria contorta</i>	[10]
Partridge, red-legged (<i>Alectoris rufa</i>)†	Nematoda	<i>Ascaridia galli</i> †	[24]
	Protozoa	<i>Histomonas meleagridis</i> †	[24]
Peafowl (<i>Pavo cristatus</i>)	Nematoda	<i>Ascaridia</i> sp.	[10]
		<i>Capillaria</i> sp.†	[18]
		<i>Heterakis</i> sp.	[10]
		<i>Trichostrongylus tenuis</i>	[10]
	Protozoa	<i>Eimeria</i> sp.†	[18]
		<i>Histomonas meleagridis</i>	[98]
Penguin, blue (<i>Eudyptula minor</i>)	Nematoda	<i>Capillaria</i> sp.†	[99]
		<i>Contraecaecum</i> sp.	[10]
	Cestoda	<i>Tetrabothrius</i> sp.†	[100]
	Trematoda	<i>Echinostoma</i> sp.?	[101]
		<i>Galactosomum</i> sp.†	[99]
		<i>Hydrodermia</i> sp.?	[101]
	Acanthocephala	<i>Corynosoma</i> sp.†	[99]
	Protozoa	<i>Plasmodium relictum</i> †	[102]
Penguin, Fiordland crested (<i>Eudyptes pachyrhynchus</i>)	Protozoa	<i>Leucocytozoon tawaki</i>	[103]
		<i>Plasmodium relictum</i>	[17]
Penguin, gentoo (<i>Pygoscelis papua</i>)	Nematoda	<i>Anisakis</i> sp.?	[10]
	Acanthocephala	<i>Corynosoma</i> sp.	[10]
Penguin, rockhopper (<i>Eudyptes chrysocome</i>)	Nematoda	<i>Contraecaecum eudyptes</i>	[30]

Pheasant, Himalayan monal (<i>Lophophorus impejanus</i>)†	Protozoa	<i>Plasmodium</i> sp.†	[107]
Pheasant, ring-necked (<i>Phasianus colchicus</i>)	Nematoda	<i>Capillaria cadovulvata</i>	[10]
		<i>Heterakis gallinarum</i>	[10]
		<i>Heterakis isolonche</i>	[10]
		<i>Syngamus trachea</i>	[10]
	Protozoa	<i>Eimeria duodenalis</i> †	[18]
		<i>Eimeria pacifica</i> †	[18]
		<i>Eimeria phasiani</i> †	[18]
		<i>Histomonas meleagridis</i>	[98]
Pigeon, New Zealand (<i>Hemiphaga novaeseelandiae</i>)	Protozoa	<i>Eimeria</i> sp.†	[18]
		<i>Plasmodium</i> sp.†	[12]
		<i>Sarcocystis</i> sp.	[40]
		<i>Trichomonas</i> sp.	[108]
Pigeon, rock (<i>Columba livia</i>)	Nematoda	<i>Ascaridia columbae</i> †	[109]
		<i>Capillaria obsignata</i>	[10]
		<i>Ornithostrongylus quadricolatus</i>	[10]
		<i>Pelecitus</i> sp.	[110]
	Trematoda	<i>Echinostoma revolutum</i>	[10]
	Protozoa	<i>Eimeria labbeana</i>	[98]
		<i>Trichomonas gallinae</i>	[111]
Pipit (<i>Anthus novaeseelandiae</i>)	Protozoa	<i>Plasmodium</i> sp.	[17]
Plover, shore (<i>Thinornis novaeseelandiae</i>)†	Nematoda	<i>Capillaria</i> sp.†	[28]
Pukeko (<i>Porphyrio porphyrio melanotus</i>)†	Nematoda	<i>Capillaria</i> sp.†	[112]
Quail, bobwhite (<i>Colinus virginianus</i>)†	Nematoda	<i>Capillaria</i> sp.†	[113]

Saddleback (<i>Philesturnus carunculatus</i>)	Nematoda	<i>Porrocaecum</i> sp.†	[115]
	Cestoda	<i>Choanotaenia infundibulum</i>	[116]
		<i>Raillietina</i> sp.†	[117]
	Protozoa	<i>Plasmodium</i> sp.†	[118]
Scaup, New Zealand (<i>Aythya novaeseelandiae</i>)	Trematoda	<i>Cotylurus</i> sp.?	[13]
		<i>Dendritobilharzia pulverulenta</i>	[36]
		<i>Echinoparyphium cinctum</i> †	[119]
		<i>Echinoparyphium recurvatum</i>	[13]
		<i>Echinostoma revolutum</i> †	[119]
		<i>Psilochasmus oxyurus</i>	[13]
	<i>Trichobilharzia</i> sp.	[10]	
Shag, Auckland Island (<i>Phalacrocorax colensoi</i>)	Nematoda	<i>Anisakis</i> sp.?	[10]
		<i>Contracecum spiculigerum</i>	[10]
		<i>Cosmocephalus</i> sp.	[10]
		<i>Streptocara cirrohamata</i>	[10]
		<i>Corynosoma clavatum</i>	[10]
Shag, black (great cormorant) (<i>Phalacrocorax carbo</i>)	Nematoda	<i>Contracecum spiculigerum</i>	[10]
		<i>Eustrongylides</i> sp.	[10]
		<i>Hedruris spinigera</i>	[10]
Shag, Campbell Island (<i>Phalacrocorax campbelli</i>)	Nematoda	<i>Contracecum spiculigerum</i>	[10]
Shag, little (white-throated cormorant) (<i>Phalacrocorax melanoleucos brevirostris</i>)	Nematoda	<i>Contracecum spiculigerum</i>	[10]
		<i>Cosmocephalus jaenschi</i>	[48]
Shag, Macquarie Island (<i>Phalacrocorax atriceps purpurascens</i>)	Nematoda	<i>Anisakis</i> sp.?	[10]
		<i>Contracecum spiculigerum</i>	[10]

		<i>Psilochasmus oxyurus</i>	[13]
		<i>Trichobilharzia ocellata</i>	[34]
		<i>Typhlocoelum cucumerinum</i>	[13]
Silvereye (<i>Zosterops lateralis lateralis</i>)	Nematoda	<i>Syngamus trachea</i>	[10]
	Protozoa	<i>Atoxoplasma paddae</i>	[121]
		<i>Plasmodium</i> sp.†	[12]
Skylark (<i>Alauda arvensis</i>)	Protozoa	<i>Haemoproteus danilewsky</i>	[17]
		<i>Plasmodium</i> sp.	[17]
Sparrow, hedge (<i>Prunella modularis</i>)	Protozoa	<i>Giardia</i> sp.	[16]
Sparrow, house (<i>Passer domesticus</i>)	Protozoa	<i>Atoxoplasma</i> sp.	[40]
		<i>Cryptosporidium</i> sp.	[16]
		<i>Giardia</i> sp.	[16]
		<i>Plasmodium relictum</i>	[17]
Starling (<i>Sturnus vulgaris</i>)	Nematoda	<i>Capillaria</i> sp.†	[24]
		<i>Porrocaecum</i> sp.†	[24]
		<i>Syngamus trachea</i>	[10]
	Protozoa	<i>Cryptosporidium</i> sp.	[16]
		<i>Plasmodium relictum</i> †	[22]
Stitchbird (<i>Notiomystis cincta</i>)†	Nematoda	<i>Capillaria</i> sp.†	[122]
		<i>Syngamus trachea</i> †	[55]
	Protozoa	<i>Atoxoplasma</i> sp.†	[123]
Stilt, black (<i>Himantopus novaezelandiae</i>)	Nematoda	<i>Capillaria</i> sp.	[7]
	Cestoda	<i>Diplophallus polymorphus</i>	[7]
	Trematoda	<i>Acanthoparyphium</i> sp.	[7]
		<i>Catatropis</i> sp.	[7]
		<i>Cotylurus</i> sp.	[7]
	Protozoa	<i>Eimeria</i> sp.†	[109]

Swan, black (<i>Cygnus atratus</i>)	Nematoda	<i>Amidostomum</i> sp.	[124]
		<i>Capillaria</i> sp.	[10]
		<i>Pectinospirura</i> sp.	[124]
	Cestoda	<i>Nematoparataenia paradoxa</i>	[124]
		<i>Parabisaccanthes bisacculina</i> †	[32]
	Trematoda	<i>Cotylurus</i> sp.?	[13]
		<i>Dendritobilharzia pulverulenta</i>	[36]
		<i>Echinoparyphium recurvatum</i>	[13]
<i>Hyptiasmus magnus</i>		[124]	
<i>Psilochasmus oxyurus</i>		[13]	
Swan, mute (<i>Cygnus olor</i>)	Trematoda	<i>Dendritobilharzia pulverulenta</i>	[36]
Takahe (Notornis) (<i>Porphyrio mantelli</i>)†	Nematoda	<i>Capillaria</i> sp.†	[95]
	Protozoa	<i>Eimeria</i> sp.†	[95]
Teal, brown (<i>Anas aucklandica chlorotis</i>)†	Nematoda	<i>Capillaria</i> sp.†	[112]
	Cestoda	<i>Aploparaksis</i> sp.†	[99]
	Trematoda	<i>Microphallus</i> sp.†	[24]
	Protozoa	<i>Eimeria</i> sp.†	[112]
Teal, Campbell Island (<i>Anas aucklandica nesiotis</i>)†	Nematoda	<i>Capillaria</i> sp.†	[24]
Thrush, song (<i>Turdus philomelos</i>)	Nematoda	<i>Capillaria</i> sp.	[10]
		<i>Porrocaecum ensicaudatum</i>	[14]
	Cestoda	<i>Anomotaenia verulamii</i>	[15]
		<i>Aploparaksis dujardinii</i>	[15]
		<i>Dilepis undula</i>	[15]
	Acanthocephala	<i>Plagiorhynchus cylindraceus</i> †	[18]
	Protozoa	<i>Cryptosporidium</i> sp.	[16]
		<i>Giardia</i> sp.	[16]
		<i>Haemoproteus danilewsky</i>	[17]
		<i>Plasmodium relictum</i>	[17]

Tomtit (<i>Petroica macrocephala</i>)†	Protozoa	<i>Plasmodium</i> sp.†	[12]

Weka (<i>Gallirallus australis</i>)†	Protozoa	<i>Plasmodium</i> sp.†	[12]
Weka, Stewart Island (<i>Gallirallus australis scotti</i>)	Protozoa	<i>Atoxoplasma paddae</i>	[121]
Yellowhammer (<i>Emberiza citrinella</i>)	Nematoda	<i>Capillaria emberizae</i>	[48]
Yellowhead (<i>Mohoua ochrocephala</i>)†	Protozoa	<i>Plasmodium</i> sp.†	[126]

Illustration 2

PART 2: PARASITE LIST BY PARASITE

Nematoda

<i>Acuaria skrjabini</i>	cordon-bleu finch
<i>Acuaria</i> sp.?	kiwi
<i>Amidostomum acutum</i>	grey duck†, mallard duck†, paradise duck
<i>Amidostomum anseris</i> †	Canada goose†, domestic goose†
<i>Amidostomum</i> sp.	black swan
<i>Anisakis</i> sp.?	Auckland Island shag, black-browed albatross, gentoo penguin, Macquarie Island shag, royal penguin
<i>Ascaridia columbae</i> †	rock pigeon†
<i>Ascaridia galli</i>	domestic fowl, red-legged partridge†
<i>Ascaridia platycerci</i>	Chatham Island red-crowned parakeet, masked lovebird, rose-ringed parakeet†
<i>Ascaridia</i> sp.	budgerigar, cockatiel, domestic turkey, galah, parakeet, peach-faced lovebird, peafowl, regent parrot, rosella
<i>Ascaridia zelandica</i>	shining cuckoo
<i>Ascaris apterycis</i> ?	brown kiwi
<i>Capillaria anatis</i>	domestic goose†, grey duck†, mallard duck†, paradise duck†
<i>Capillaria annulata</i>	domestic fowl
<i>Capillaria cadovulvata</i>	grey partridge, ring-necked pheasant
<i>Capillaria caudinflata</i>	domestic fowl
<i>Capillaria contorta</i>	grey partridge
<i>Capillaria emberizae</i>	yellowhammer
<i>Capillaria obsignata</i>	domestic fowl, rock pigeon
<i>Capillaria perforans</i> †	Guinea fowl†
<i>Capillaria plagiaticia</i>	kea
<i>Capillaria</i> sp.	Australasian harrier†, blackbird, black stilt, black swan, blue duck†, blue penguin†, bobwhite quail†, brown teal†, Campbell Island teal†, chukor partridge, kaka†, kakapo†, kiwi, kokako†, masked lovebird, morepork†, peafowl†, pied stilt, pukeko†, red-billed gull†, rosella, shore plover†, song thrush, starling†, stitchbird†, sun conure†, takahe (Notornis)†

<i>Echinuria australis</i>	grey duck
<i>Echinuria uncinata</i>	grey duck, mallard duck
<i>Epomidiostomum uncinatum</i> †	grey duck†, mallard duck†, paradise duck†
<i>Eustrongylides</i> sp.	Australasian bittern, black shag (black cormorant), spotted shag
<i>Hedruris spinigera</i>	black shag (black cormorant)
<i>Heterakis gallinarum</i>	brown quail, domestic fowl, domestic goose†, domestic turkey, guinea fowl†, morepork, ring-necked pheasant
<i>Heterakis gracilicauda</i>	brown kiwi, kiwi
<i>Heterakis isolonche</i>	ring-necked pheasant
<i>Heterakis</i> sp.	peafowl
<i>Heterakis vesicularis</i> ?	domestic fowl
<i>Libyostongylus douglassii</i> †	ostrich†
<i>Microtetrameres nestoris</i>	kaka
<i>Microtetrameres</i> sp.	shining cuckoo
<i>Ornithostongylus quadriradiatus</i>	rock pigeon
<i>Oxyspirura</i> sp.†	kaka†
<i>Pectinospirura</i> sp.	black swan
<i>Pelecitus</i> sp.	rock pigeon
<i>Porrocaecum crassum</i>	paradise duck
<i>Porrocaecum ensicaudatum</i>	blackbird, kiwi, song thrush
<i>Porrocaecum</i> sp.	brown kiwi, saddleback†, starling†
<i>Procyrnea kea</i>	kea
<i>Sciadiocara tarapunga</i>	red-billed gull, southern black-backed gull†
<i>Serratospiculum guttatum</i> †	New Zealand falcon†
<i>Streptocara cirrohamata</i>	Auckland Island shag
<i>Syngamus trachea</i>	blackbird, chukor partridge, domestic fowl, kaka†, kea, kiwi†, parson finch, pictorella finch, ring-necked pheasant, silvereye, starling, stitchbird†
<i>Terranova</i> sp.?	royal penguin
<i>Tetrameres</i> sp.	grey duck†, kiwi, mallard duck†, paradise duck†
<i>Tetrameres tarapungae</i>	red-billed gull
<i>Toxocara cati</i>	brown kiwi
<i>Trichostrongylus tenuis</i>	brown quail, Canada goose†, domestic goose†, emu†, paradise duck, peafowl
<i>Trichostrongylus</i> sp.	South Island pied oystercatcher

Cestoda

<i>Anomotaenia ciliata</i> †	grey duck†, mallard duck†, paradise duck†
<i>Anomotaenia minuta</i>	brown kiwi

	<i>Dilepis undula</i>	blackbird, song thrush
	<i>Diorchis flavescens</i> †	grey duck†
	<i>Diorchis inflata</i> †	grey duck†, mallard duck†
	<i>Diplophallus polymorphus</i>	black stilt, pied stilt
	<i>Echinolepis carioica</i>	domestic fowl
	<i>Fimbriaria fasciolaris</i>	grey duck†, mallard duck†, paradise duck
	<i>Gastrotaenia cygni</i> †	grey duck†, mallard duck†
	<i>Hymenolepis alaskensis</i>	South Island pied oystercatcher, southern black-backed gull†, variable oystercatcher
	<i>Hymenolepis megalops</i>	grey duck, mallard duck†, paradise duck
	<i>Hymenolepis serpentulus</i>	blackbird
	<i>Nadejdolepis laurie</i> †	South Island pied oystercatcher†, variable oystercatcher†
	<i>Nematoparataenia paradoxa</i>	black swan
	<i>Ophryocotyle proteus</i> †	eastern bar-tailed godwit†, South Island pied oystercatcher†
	<i>Parabisaccanthes bisacculina</i> †	black swan†
	<i>Paricterotaenia apterygis</i> ?	brown kiwi
	<i>Proterogynotaenia dougi</i> †	South Island pied oystercatcher†
	<i>Proterogynotaenia haematopodis</i>	South Island pied oystercatcher
	<i>Pulluterina nestoris</i>	kea
	<i>Raillietina cesticillus</i>	domestic fowl
	<i>Raillietina graeca</i>	chukor partridge
	<i>Raillietina</i> sp.	brown kiwi, saddleback†
	<i>Sobolevicanthus gracilist</i>	grey duck†, paradise duck†
	<i>Sobolevicanthus</i> sp.†	blue duck†, "wild" duck†
	<i>Stringopotaenia psittacea</i>	kakapo
	<i>Taenia apterycis</i> ?	brown kiwi
	<i>Taenia increscens</i> ?	variable oystercatcher
	<i>Tetrabothrius</i> sp.†	blue penguin†
Trematoda	<i>Acanthoparyphium</i> sp.	black stilt, pied stilt, South Island pied oystercatcher
	<i>Acanthoparyphium spinulosum</i> †	eastern bar-tailed godwit†
	<i>Catatropis</i> sp.	black stilt, grey duck†, mallard duck†, New Zealand shoveler, paradise duck, pied stilt, "wild" duck
	<i>Cloacitrema</i> sp.	South Island pied oystercatcher†, variable oystercatcher
	<i>Cotylurus cornutus</i>	Canada goose†, grey duck†, paradise duck
	<i>Cotylurus</i> sp.	black stilt, black swan?, New Zealand scaup?, "wild" duck?

<i>Echinostoma revolutum</i>	Canada goose, domestic goose, grey duck†, mallard duck†, New Zealand scaup†, New Zealand shoveler, paradise duck, rock pigeon, southern black-backed gull†, "wild" duck
<i>Echinostoma</i> sp.	blue penguin?, paradise duck†
<i>Galactosomum</i> sp.†	blue penguin†
<i>Himasthla leptosoma</i> †	eastern bar-tailed godwit†
<i>Hydrodermia</i> sp.?	blue penguin?
<i>Hypoderaeum conoideum</i> †	paradise duck†
<i>Hyptiasmus magnus</i>	black swan
<i>Levinseniella</i> sp.?	"wild" duck?
<i>Lyperosomum megacotylosum</i>	brown kiwi
<i>Maritrema gratiosum</i> †	eastern bar-tailed godwit†, South Island pied oystercatcher†
<i>Maritrema novaezealandensis</i> †	red-billed gull†
<i>Meiogymnophallus</i> sp.†	"oystercatcher"†
<i>Metorchis</i> sp.	"wild" duck
<i>Microphallus</i> sp.†	brown teal†, "wild" duck†
<i>Notocotylus attenuatus</i>	Canada goose†, paradise duck
<i>Notocotylus gippyensis</i>	Canada goose, domestic goose, grey duck, New Zealand shoveler, paradise duck, "wild" duck
<i>Notocotylus</i> sp.	South Island pied oystercatcher, variable oystercatcher†
<i>Notocotylus tadornae</i>	domestic goose, paradise duck
<i>Ornithobilharzia canaliculata</i>	southern black-backed gull
<i>Ornithobilharzia kowalewskii</i>	godwit
<i>Ornithobilharzia</i> sp.	New Zealand shoveler
<i>Parorchis acanthus</i>	eastern bar-tailed godwit†, red-billed gull, South Island pied oystercatcher†, southern black-backed gull†
<i>Philophthalmus</i> sp.	southern black-backed gull
<i>Pittacium pittacium</i> †	variable oystercatcher†
<i>Psilochasmus oxyurus</i>	black swan, grey duck†, New Zealand scaup, New Zealand shoveler, "wild" duck
<i>Psilotrema</i> sp.†	grey duck†, mallard duck†
<i>Renicola</i> sp.†	spotted shag†
<i>Spelotrema</i> sp.?	"wild duck"?
<i>Trichobilharzia ocellata</i>	New Zealand shoveler
<i>Trichobilharzia</i> sp.	grey duck, mallard duck, New Zealand scaup, "wild" duck
<i>Typhlocoelum cucumerinum</i>	New Zealand shoveler, paradise duck†, "wild"

Protozoa

<i>Plagiorhynchus cylindraceus</i> †	song thrush†
<i>Plagiorhynchus</i> sp.	New Zealand dotterel†
<i>Profilicollis antarcticus</i> †	bar-tailed godwit†, South Island pied oystercatcher†, southern black-backed gull†
<i>Profilicollis novaezealandensis</i> †	bar-tailed godwit†, red-billed gull†, South Island pied oystercatcher†, southern black-backed gull†,
<i>Profilicollis</i> sp.	pied stilt
<i>Atoxoplasma adiei</i> ?	canary
<i>Atoxoplasma paddae</i>	silveryeye, Stewart Island weka
<i>Atoxoplasma</i> sp.	finch, greenfinch, house sparrow, kaka†, stitchbird†
<i>Babesia kiwiensis</i> †	brown kiwi†
<i>Balantidium coli</i> †	ostrich†
<i>Cryptosporidium</i> sp.	domestic fowl†, house sparrow, lovebird, ostrich†, song thrush, starling
<i>Eimeria acervulina</i>	domestic fowl
<i>Eimeria brunetti</i>	domestic fowl
<i>Eimeria duodenalis</i> †	ring-necked pheasant†
<i>Eimeria kofoidi</i>	chukor partridge
<i>Eimeria labbeana</i>	rock pigeon
<i>Eimeria maxima</i>	domestic fowl
<i>Eimeria meleagridis</i>	domestic turkey
<i>Eimeria meleagrimitis</i>	domestic turkey
<i>Eimeria necatrix</i>	domestic fowl
<i>Eimeria pacifica</i> †	ring-necked pheasant†
<i>Eimeria phasiani</i> †	ring-necked pheasant†
<i>Eimeria</i> sp.	black stilt†, brown kiwi, brown teal†, kakapo†, New Zealand pigeon†, peafowl†, takahe (Notornis)†, yellow-eyed penguin
<i>Eimeria tenella</i>	domestic fowl
<i>Eimeria truncata</i> ?	kiwi
<i>Giardia</i> sp.	black stilt, blackbird, chaffinch, hedge sparrow, house sparrow, kaka, song thrush
<i>Haemoproteus danilewsky</i>	blackbird, skylark, song thrush
<i>Haemoproteus</i> sp.†	Australasian gannet†, New Zealand robin†
<i>Hepatozoon albatrossi</i> †	Royal albatross†
<i>Hepatozoon kiwi</i> †	brown kiwi†
<i>Histomonas meleagridis</i>	domestic fowl, domestic turkey, peafowl, red-legged partridge†, ring-necked pheasant
<i>Isoospora</i> sp.	greenfinch?, kokako?†, ostrich†

<i>Plasmodium</i> sp.	Australasian gannett†, Australian magpie†, bellbird†, brown kiwi†, fantail†, grey duck, grey warbler†, Himalayan monal pheasant†, New Zealand pigeon†, New Zealand robin†, pipit, rose-ringed parakeet†, saddleback†, silvereye†, skylark, tomtitt†, weka†, yellow-fronted parakeet†, yellowhead†
<i>Sarcocystis</i> sp.	New Zealand pigeon (cysts)
<i>Spironucleus</i> sp.†	ostrich†
<i>Toxoplasma gondii</i>	canary, domestic fowl, kaka?, little spotted kiwi?, tawny frogmouth†
<i>Trichomonas gallinae</i>	rock pigeon
<i>Trichomonas</i> sp.	New Zealand pigeon

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Reviews

Review 1

Review Title: An updated checklist of helminth and protozoan parasites of birds in New Zealand

Posted by Dr. Bill Pomroy on 16 Jan 2011 03:14:24 PM GMT

1	Is the subject of the article within the scope of the subject category?	Yes
2	Are the interpretations / conclusions sound and justified by the data?	Yes
3	Is this a new and original contribution?	Yes
4	Does this paper exemplify an awareness of other research on the topic?	Yes
5	Are structure and length satisfactory?	Yes
6	Can you suggest brief additions or amendments or an introductory statement that will increase the value of this paper for an international audience?	Yes
7	Can you suggest any reductions in the paper, or deletions of parts?	No
8	Is the quality of the diction satisfactory?	Yes
9	Are the illustrations and tables necessary and acceptable?	Yes
10	Are the references adequate and are they all necessary?	Yes
11	Are the keywords and abstract or summary informative?	Yes

Rating: 8

Comment:

Is a thorough review and timely to update previous knowledge. I have only one addition the author may wish to consider and that is Jakob-Hoff, Buchan et al 1999 Kiwi coccidia – North Island survey results Kokako 1 (6) 3-5. I am not entirely sure about the volume number for Kokako.

Competing interests: no competing interests to declare

Invited by the author to make a review on this article? : Yes

Experience and credentials in the specific area of science:

veterinary parasitologist

Publications in the same or a related area of science: Yes

How to cite: Pomroy B. An updated checklist of helminth and protozoan parasites of birds in New Zealand [Review of the article 'An updated checklist of helminth and protozoan parasites of birds in New Zealand' by]. WebmedCentral 1970;2(1):REVIEW_REF_NUM378

Review 2

Review Title: An Updated Checklist of Helminth & Protozoan Parasites of Birds in New Zealand

Posted by Dr. Tony Charleston on 31 Oct 2010 05:42:06 AM GMT

1	Is the subject of the article within the scope of the subject category?	Yes
2	Are the interpretations / conclusions sound and justified by the data?	Yes
3	Is this a new and original contribution?	Yes
4	Does this paper exemplify an awareness of other research on the topic?	Yes
5	Are structure and length satisfactory?	Yes
6	Can you suggest brief additions or amendments or an introductory statement that will increase the value of this paper for an international audience?	Yes
7	Can you suggest any reductions in the paper, or deletions of parts?	No
8	Is the quality of the diction satisfactory?	Yes
9	Are the illustrations and tables necessary and acceptable?	Yes
10	Are the references adequate and are they all necessary?	Yes
11	Are the keywords and abstract or summary informative?	Yes

Rating: 0

Comment: This publication is a very welcome and timely update of the only published comprehensive checklist of helminth and protozoan parasites of birds, both domestic and wild, in New Zealand. Since Dr McKenna published the first edition of this checklist over a decade ago, a substantial number of new host/parasite records have accumulated. These are often buried in laboratory and diagnostic reports and easily missed which makes the publication of this checklist so valuable. The list is easy to use and essentially comprises a host list, a parasite list and a reference list. The host list is arranged alphabetically by common names, although the taxonomic names are also given, making it very easy for anyone unfamiliar with a bird's taxonomic name to access the list of parasites recorded from it. The source reference for each parasite record is also indicated. The parasites, on the other hand, are listed taxonomically alongside the recorded bird hosts, so that determining from which hosts a particular parasite has been recorded, is also straightforward. The reference list is comprehensive with 126 references cited in all. In research into avian health and disease or conservation and management, particularly in relation to wild birds in New Zealand, parasites and their potential to cause disease are important considerations. Knowing what has or has not been recorded in this country is a key aspect of this. For anyone working in this area, this checklist is an absolutely indispensable and critical source of information, as was the first edition before.

Competing interests: No

Invited by the author to make a review on this article? : Yes

Experience and credentials in the specific area of science: Almost 50 years researching and teaching veterinary parasitology

Publications in the same or a related area of science: Yes

How to cite: Charleston T. An Updated Checklist of Helminth & Protozoan Parasites of Birds in New Zealand [Review of the article 'An updated checklist of helminth and protozoan parasites of birds in New Zealand' by]. WebmedCentral 1970;1(10):REVIEW_REF_NUM96

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