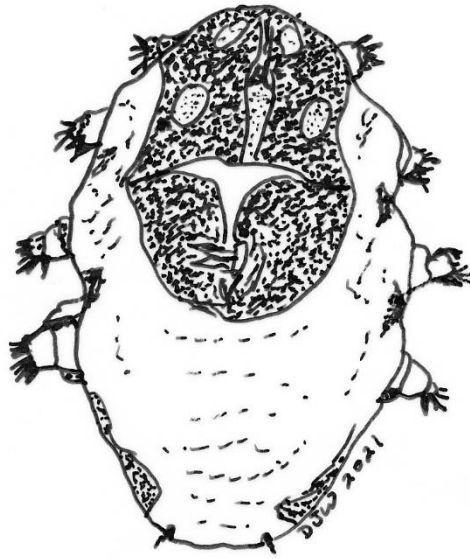


**Checklist of Mites
(Arachnida, Acari)
Reported from the Cloacae of Turtles**



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Cover Image: *Cloacarus*

Introduction

Camin et al. (1967) described a new family (Cloacaridae), a new genus (*Cloacarus*), and two new species of parasitic mites (Acari: Prostigmata) discovered in the cloacas of two North American turtles. These minute, soft-bodied mites exhibit strongly reduced external morphological features thought to result from their endoparasitic mode of life (Bochkov and O'Connor, 2008). Since the initial discovery of these parasites, additional species have been described from the cloacal and, more rarely, subcutaneous tissues of various turtles on four continents. These mites probably infest their hosts through venereal transmission and are believed to share an ancient relationship with their hosts (Camin et al., 1967; Pence and Casto, 1975; Pence and Wright, 1998). Most of the described species are known only from female specimens and little is known about their biology. No species has been reported from more than a single host species, and most are known from only a single locality. Only the Caspian turtle (*Mauremys caspica*) has been found to harbor more than a single species of cloacal mite. Here, I provide host-parasite and parasite-host checklists for these mites, along with the geographic distribution information associated with the available reports. Clearly, additional studies are merited in order to determine if other turtle species are infested with known or yet to be described species of mites, if any additional turtles serve as hosts for more than a single mite species, and to further elucidate the phylogenetic relationships and evolution of these interesting parasites and their hosts.

Part 1. Host-Parasite Checklist

This section of the catalog lists turtle hosts and their mite parasites along with the associated geographic distribution records. Host names are listed alphabetically by family, genus, and species. Turtle nomenclature has been updated and follows the Turtle Taxonomy Working Group's (2021) checklist. Mite nomenclature follows the original species descriptions. Reference citations are provided for each report.

Family Chelidae

Broad-shelled Snake-necked Turtle (*Chelodina expansa*)

Emyduracarus sp. 2: Queensland, Australia – Bochkov and O'Connor, 2008

Eastern Snake-necked Turtle (*Chelodina longicollis*)

Emyduracarus sp. 1: New South Wales, Australia – Bochkov and O'Connor, 2008

Sawshelled Turtle (*Myuchelys latiserenum*)

Emyduracarus australis Fain, 1968: Queensland, Australia – Fain, 1968; Domrow, 1990

Family Cheloniidae

Green Sea Turtle (*Chelonia mydas*)

Chelonacarus elongatus Pence and Wright, 1998: Bocas del Toro Province, Panama – Pence and Wright, 1998

Family Chelydridae

North American Snapping Turtle (*Chelydra serpentina*)

Cloacarus faini Camin and Singer, 1967: Kansas, USA – Camin et al., 1967; Bochkov and O'Connor, 2008

Family Emydidae

Painted Turtle (*Chrysemys picta*)

Cloacarus beeri: Michigan(?), Minnesota(?), USA – Camin et al., 1967

Chicken Turtle (*Deirochelys reticularia*)

Caminacarus deirochelys Fain, 1968: Florida, USA – Fain, 1968

False Map Turtle (*Graptemys pseudogeographica*)

Caminacarus dawsoni Bochkov and O'Connor, 2008: New York, USA – Bochkov and O'Connor, 2008

Eastern Box Turtle (*Terrapene carolina*)

Caminacarus terrapenae Pence and Casto, 1975: Louisiana, USA – Pence and Casto, 1975; Bochkov and O'Connor, 2008

Red-eared Slider (*Trachemys scripta elegans*)

Caminacarus chrysemys Pence and Casto, 1975: Louisiana, USA – Pence and Casto, 1975; Bochkov and O'Connor, 2008

Family Geoemydidae

Caspian Turtle (*Mauremys caspica*)

Caminacarus costai Fain, 1968: Haifa District, Israel – Fain, 1968

Caminacarus theodori Fain, 1968: Haifa District, Israel – Fain, 1968

Family Pelomedusidae

African Helmeted Terrapin (*Pelomedusa subrufa*)

Caminacarus pelomedusae Fain, 1968: Ituri Province, Democratic Republic of the Congo; Tabora Region, United Republic of Tanzania – Fain, 1968

West African Mud Turtle (*Pelusios castaneus*)

Caminacarus pelusios Fain, 1968: Lake Muhazi, Eastern Province(?), Rwanda – Fain, 1968

Family Testudinidae

Asia Minor Tortoise (*Testudo graeca iberica*)

Theodoracarus testudinis Fain, 1968: Jerusalem, Israel/Palestine – Fain, 1968

Family Trionychidae

Chinese Softshell Turtle (*Pelodiscus sinensis*)

Caminacarus sinensis Fain, 1968: China – Fain, 1968

Part 2. Parasite-Host Checklist

This section of the catalog lists mite parasites and their turtle hosts along with their geographic distribution records. Mites are listed alphabetically by genus and species. Mite nomenclature follows the original species descriptions. Host nomenclature has been updated and follows the Turtle Taxonomy Working Group's (2021) checklist. Bochkov and O'Connor (2008) describe characteristics of the mite family, subfamily, and genera, and Fain (1968) provides a table summarizing the principle characteristics for most of the species. Reference citations are provided below for each report.

Superfamily Cheyletoidea**Family Cloacaridae****Subfamily Cloacarinae****Genus *Caminacarus***

Caminacarus chrysemys Pence and Casto, 1975

Red-eared Slider (*Trachemys scripta elegans*): Louisiana, USA – Pence and Casto, 1975;
Bochkov and O'Connor, 2008

Caminacarus costai Fain, 1968

Caspian Turtle (*Mauremys caspica*): Haifa District, Israel – Fain, 1968

Caminacarus dawsoni Bochkov and O'Connor, 2008

False Map Turtle (*Graptemys pseudogeographica*): New York, USA – Bochkov and O'Connor, 2008

Caminacarus deirochelys Fain, 1968

Chicken Turtle (*Deirochelys reticularia*): Florida, USA – Fain, 1968

Caminacarus pelomedusae Fain, 1968

African Helmeted Terrapin (*Pelomedusa subrufa*): Ituri Province, Democratic Republic of the Congo; Tabora Region, United Republic of Tanzania – Fain, 1968

Caminacarus pelusios Fain, 1968

West African Mud Turtle (*Pelusios castaneus*): Lake Muhazi, Eastern Province(?), Rwanda – Fain, 1968

Caminacarus sinensis Fain, 1968

Chinese Softshell Turtle (*Pelodiscus sinensis*): China – Fain, 1968

Caminacarus terrapenae Pence and Casto, 1975

Eastern Box Turtle (*Terrapene carolina*): Louisiana, USA – Pence and Casto, 1975; Bochkov and O'Connor, 2008

Caminacarus theodori Fain, 1968

Caspian Turtle (*Mauremys caspica*): Haifa District, Israel – Fain, 1968

Genus *Chelonacarus**Chelonacarus elongatus* Pence and Wright, 1998

Green Sea Turtle (*Chelonia mydas*): Bocas del Toro Province, Panama – Pence and Wright, 1998

Genus *Cloacarus**Cloacarus beeri* Camin and Oliver, 1967

Painted Turtle (*Chrysemys picta*): Michigan(?), Minnesota(?), USA – Camin et al., 1967

Cloacarus faini Camin and Singer, 1967

North American Snapping Turtle (*Chelydra serpentina*): Kansas, USA – Camin et al., 1967; Bochkov and O'Connor, 2008

Genus *Emyduracarus**Emyduracarus australis* Fain, 1968

Sawshelled Turtle (*Myuchelys latisternum*): Queensland, Australia – Fain, 1968; Domrow, 1990

Emyduracarus sp. 1

Eastern Snake-necked Turtle (*Chelodina longicollis*): New South Wales, Australia – Bochkov and O'Connor, 2008

Emyduracarus sp. 2

Broad-shelled Snake-necked Turtle (*Chelodina expansa*): Queensland, Australia – Bochkov and O'Connor, 2008

Genus *Theodoracarus**Theodoracarus testudinis* Fain, 1968

Asia Minor Tortoise (*Testudo graeca iberica*): Jerusalem, Israel/Palestine – Fain, 1968

Subfamily Pneumophaginae¹**Genus *Pneumophagus****Pneumophagus bubonis* Fain and Smiley, 1989

Great Horned Owl (*Bubo virginianus*): Michigan, USA - Fain and Smiley, 1989; Bochkov and O'Connor, 2008

¹ This subfamily and its single species are included here for the sake of completeness. It is the only species in the family reported from a host other than a turtle; there is only a single record of this species reported from the lungs in one bird.

Part 3. Geographic Records

This section of the catalog provides a list of turtle hosts and their mite parasites for each state or province and country from which records have been published. Geographic locations and hosts are listed alphabetically. Turtle nomenclature has been updated and follows the Turtle Taxonomy Working Group's (2021) checklist. Mite nomenclature follows the original species descriptions. Reference citations are provided below for each report.

Africa

Democratic Republic of the Congo

Ituri Province

African Helmeted Terrapin (*Pelomedusa subrufa*): *Caminacarus pelomedusae* Fain, 1968 – Fain, 1968

Rwanda

Lake Muhazi, Eastern Province(?)

West African Mud Turtle (*Pelusios castaneus*): *Caminacarus pelusios* Fain, 1968 – Fain, 1968

United Republic of Tanzania

Tabora Region

African Helmeted Terrapin (*Pelomedusa subrufa*): *Caminacarus pelomedusae* Fain, 1968 – Fain, 1968

Asia

China

Chinese Softshell Turtle (*Pelodiscus sinensis*): *Caminacarus sinensis* Fain, 1968 – Fain, 1968

Israel

Haifa District

Caspian Turtle (*Mauremys caspica*): *Caminacarus costai* Fain, 1968 – Fain, 1968

Caspian Turtle (*Mauremys caspica*): *Caminacarus theodori* Fain, 1968 – Fain, 1968

Jerusalem

Asia Minor Tortoise (*Testudo graeca iberica*): *Theodoracarus testudinis* Fain, 1968 – Fain, 1968

Palestine

Jerusalem

Asia Minor Tortoise (*Testudo graeca iberica*): *Theodoracarus testudinis* Fain, 1968 – Fain, 1968

Australia

New South Wales

Eastern Snake-necked Turtle (*Chelodina longicollis*): *Emyduracarus* sp. 1 – Bochkov and O'Connor, 2008

Queensland

Broad-shelled Snake-necked Turtle (*Chelodina expansa*): *Emyduracarus* sp. 2 – Bochkov and O'Connor, 2008

Sawshelled Turtle (*Myuchelys latisternum*): *Emyduracarus australis* Fain, 1968 – Fain, 1968; Domrow, 1990

North & South America**Panama**

Bocas del Toro Province

Green Sea Turtle (*Chelonia mydas*): *Chelonacarus elongatus* Pence and Wright, 1998 – Pence and Wright, 1998

United States of America

Florida

Chicken Turtle (*Deirochelys reticularia*): *Caminacarus deirochelys* Fain, 1968 – Fain, 1968

Kansas

North American Snapping Turtle (*Chelydra serpentina*): *Cloacarus faini* Camin and Singer, 1967 – Camin et al., 1967; Bochkov and O'Connor, 2008

Louisiana

Eastern Box Turtle (*Terrapene carolina*): *Caminacarus terrapenae* Pence and Casto, 1975 – Pence and Casto, 1975; Bochkov and O'Connor, 2008

Red-eared Slider (*Trachemys scripta elegans*): *Caminacarus chrysemys* Pence and Casto, 1975 – Pence and Casto, 1975; Bochkov and O'Connor, 2008

Michigan(?)

Painted Turtle (*Chrysemys picta*): *Cloacarus beeri* Camin and Oliver, 1967 – Camin et al., 1967

Minnesota(?)

Painted Turtle (*Chrysemys picta*): *Cloacarus beeri* Camin and Oliver, 1967 – Camin et al., 1967

New York

False Map Turtle (*Graptemys pseudogeographica*): *Caminacarus dawsoni* Bochkov and O'Connor, 2008 – Bochkov and O'Connor, 2008

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