

PARASITES OF AMPHIBIA. BUFONIDAE: PROCOELA: SALIENTIA. I.

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The amphibia play such an important part in the laboratory study of biology, and so many parasites are found in them by students and by research workers that it seems of value to present a check list of some of the more frequently recorded parasites in the hope that recognition of the parasites might be somewhat easier. This is the thirteenth of a series of such lists that attempts to cover the entire amphibian group, and includes all of the Bufonidae except the members of the Bufoninae. This group is recorded elsewhere.

BUFONIDAE

The Bufonidae are divided into the sub-families Bufoninae (Cosmopolitan), Criniinae (Austral-Asia), Elosiinae (mainly in Brazil), Heleophryinae (S. Africa), Leptodaetylinae (S. America and Caribbean Is.), Pseudinae (S. America and Caribbean area) and Rhinophryinae (Mexico).

Among the Criniinae (Austral-Asia) the following forms have been reported as being hosts to various parasites (7 genera with 11 spp.)

1. **CHIROLEPTES BREVIPALMATUS**: *Brachysaccus juvenilis* (Trematoda).
2. **CRINIA SIGNIFERA**: *Protoopalina tenuis* (Protozoa); and *Batrachomyia* sp? of Macleay, 1863 (Dipteran larva).
3. **HELIOPORUS ALBOPUNCTATUS**: *Filaria cochleata* (Nematoda).
4. **LIMNODYNASTES DORSALIS**: *Cosmocerca australiensis*, *C. limnodynastes*, *C. propinqua*, *Oswaldocruzia limnodynastes*, and larval *Physaloptera confusa* (Nematoda); *Dolichosaccus ischyurus* (Trematoda); *Entamoeba morula*, *Nyctotherus cordiformis*, *N.* sp? of Cleland & Johnston, 1910, *Opalina* sp? of C. & J., 1910, *O.* sp? of Metcalf, 1923, *Protoopalina acuta*, *P. dorsalis*, *P. intestinalis*, and *Zelleriella binucleata* (Protozoa); and *Bacillus* sp? of Willis, 1932 (Bacteria).
5. **L. ORNATA**: *Trypanosoma rotatorium*, *T.* sp? of Cleland & Johnston, 1910, and *T.* sp? of Laveran & Mesnil, 1912 (Protozoa).
6. **L. PERONII**: *Rhabdias hylae* (Nematoda); *Brachysaccus anartius*, *Dolichosaccus tryphesus*, *Gorgodera australiensis*, *Haematoloechus australis*, and *Opisthodiscus subclavatus* (Trematoda); and *Nyctotherus* sp? of Cleland & Johnston, 1910, *Opalina* sp? of C. & J. 1910, *O.* sp? of Metcalf, 1923, and *Protoopalina peronii* (Protozoa).
7. **L. TASMANIENSIS**: larval *Physaloptera confusa*, and *Rhabdias hylae* (Nematoda); *Opisthodiscus subclavatus* (Trematoda); and *Entamoeba morula*, *Trypanosoma clelandii*, *T. rotatorium*, *T.* sp? of Cleland & Johnston, 1910, *T.* sp? of Laveran & Mesnil, 1912, and *Zelleriella binucleata* (Protozoa).
8. **NOTADEN BENNETTI**: *Balantidium* sp? of Metcalf, 1923 (Protozoa).
9. **PSEUDOPHRYRYNE BIBRONI**: larval *Paryphostomum tenuicolle* (Trematoda); *Protoopalina bibronii* (Protozoa); and *Batrachomyia* sp? of Macleay, 1863 (Dipteran larva).
10. **UPEROLEIA MARMORATA**: *Nematotaenia* sp? of Johnston, 1916 (Cestoda); and *Batrachomyia* sp? of Macleay, 1863 (Dipteran larva).
11. **U. sp?**: *Trypanosoma rotatorium* (Protozoa).

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Among the Elosiinae (mainly Brazilian forms) the following 2 genera with 4 species have been reported as hosts to various parasites:

1. CROSSODACTYLUS GAUDICHAUDII: *Capillaria recondita* (Nematoda.)
2. ELOSIA NASUS: *Aplectana micropenis*, *A. vellardi*, *Cosmocerca parva*, and *Spirooura mascula* (Nematoda); and *Dolichosaccus amplicava*, and *Gorgoderina cedroi* (Trematoda).
3. E. PARVA: *Cosmocerca parva* (Nematoda).
4. E. RUSTICA: *Strongyloides pereirai* (Nematoda).

Among the Heleophryinae (S. African forms) the following genus with 3 spp. have been reported as hosts to protozoan parasites:

1. HELEOPHRYNE PURCELLI: *Protoopalina heleophrynes* (Protozoa).
2. H. REGIS: *Protoopalina capensis* (Protozoa).
3. H. ROSEI: *Protoopalina heleophrynes* (Protozoa).

Members of the Leptodactylinae (S. America and the Caribbean Is.) are in greater abundance and therefore are more often studied. 7 genera with 24 spp. have been reported as parasitized with a wide range of animal and plant forms.

1. EUPEMPHIX MARMORATUS: *Filaria bufonis* (Nematoda).
2. E. NANA: *Zelleriella dubia* (Protozoa).
3. E. NATTERERI: unidentified larvae (Cestoda).
4. E. TRINITATIS: *Balantidium* sp? of Metcalf, 1923 (Protozoa).
5. LEPTODACTYLUS ALBILABRIS: larval *Diphyllobothrium erinacei* (Cestoda); and *Zelleriella leptodactyli* (Protozoa).
6. L. CALIGINOSUS: *Aplectana* sp? of Travassos, et al., 1939, and *Rhabdias* sp? of T., et al., 1939 (Nematoda); *Catadiscus marinholutzi*, *C.* sp? of T., et al., 1939, and *Glypthelminis* sp? of T., et al., 1939 (Trematoda); and *Nyctotherus barberoi*, *Zelleriella leptodactyli*, and *Z. menendezii* (Protozoa).

7. L. GRACILIS: *Strongyloides carinii* (Nematoda); and *Nyctotherus bertarelli*, *Proteromonas longifila*, and *Zelleriella leptodactyli* (Protozoa).
8. L. MICROTIS: *Balantidium* sp? of Metcalf, 1923, *Nyctotherus* sp? of M., 1923, and *Zelleriella leptodactyli* (Protozoa).
9. L. MISTACEUS: *Nyctotherus heteronucleatus* (Protozoa).
10. L. OCELLATUS: *Agamonema ranuae*, *Ascaris leptodactyli*, *Cosmocerca* sp? of Travassos, et al., 1939, *Eustrongyloides* sp? of T., et al., 1939, *Foleyella convoluta*, *F. scalaris*, *F.* sp? of T., et al., 1939, *Hedroris scabra*, "Microfilaria" *tamborini*, *M.* sp? of Wenyon, 1934, *Multicaecum* sp? of T., et al., 1939, *Oswaldocruzia filiformis*, *O. lopezi*, *O. sub-auricularis*, *Oxyascaris similis*, *Oxysomatium membranosa*, *Rhabdias* sp? of Leiper, 1934, *Schulzia subventricosa*, and *Spirooura nitida* (Nematoda); *Catadiscus inopinatus*, *C. marinholutzi*, *C. uruguayensis*, *C.* sp? of Travassos, et al., 1939, *Choledocystus eucharis*, *Glypthelminis elegans*, *G. linguatula*, *G. parva*, *G. proximus*, *G. repandum*, *G. simulans*, *G.* sp? of T., et al., 1939, *Gorgoderina cryptorchis*, *G. parvicava*, *Haematoloechus neivai*, *H. ozorioi*, *Halipegus dubius*, larval *Hysteromorpha trilobum*, and *Plagiorchis lenti* (Trematoda); *Cylindrotaenia amerinana*, larval *Cysticercus ocellatus*, larval *Ichthyotaenia* sp? of Parona, 1901, *Sparganum leptodactyli*, and larval *Taenia* sp? of Parona, 1900 (Cestoda); *Centrorhynchus giganteus*, *C. tumicululus*, and *Lueheia luehei* (Acanthocephala); *Cariniella carinii*, *Cepedea rubra*, *Eimeria leptodactyli*, *Haemogregarina leptodactyli*, *H.* sp? of Franca, 1917, *H.* sp? of Plimmer, 1912, *Hegneria leptodactyli*, *Leptotheca chagasi*, *Myxidium immersum*, *M. lindoyense*, ? *Nyctotherus cordiformis*, *N. cunhai*, *N. gibber*, *N. loricatus*, *N. pavlistanusi* (in tadpoles), *N. tejeraei*, *N. vorax*, *Toxoplasma cuniculi* (experimentally), *Trichomonas batrachorum*, *Trypanosoma arcei*, *T. celestinoi*, *T. leptodactyli*, *T. ocellati*, *T. rotatorium*, *T.* sp? of Carini, 1907, *T.* sp? of Laveran & Mesnil, 1912, *T.* sp? of Wenyon, 1934, *Zelleriella antilliensis*, *Z. antunesi*, *Z. brasiliensis*, *Z.*

- caudata, *Z. corniola*, *Z. cornucopia*, *Z. cornucopioides*, *Z. cuneata*, *Z. excavata*, *Z. foliacea*, *Z. magna*, and *Z. truncata* (Protozoa); *Haemobartonello ranarum* (n. comb. for *Bartonella ranarum* Zavattari & Defendi, 1931) (Bacteria); and *Hannemania argentina*, and *H. hepatica* (Acarina).
11. L. PENTADACTYLUS: *Foleyella convoluta*, *Schrankia brasili*, *S. larvata*, and *S. schranki* (Nematoda); larval *Alaria alata*, *Gorgoderina parvicava*, and larval *Strigera vaginata* (Trematoda); and *Bertarellia leptodactyli*, *Haemogregarina heteronucleata*, ? *Nyctotherus cordiformis*, *N. cunhai*, *N. gibber*, *N. loricatus*, *N. tejerai*, *Zelleriella cornucopia*, *Z. ovonucleata*, and *Z. truncata* (Protozoa).
 12. L. PROGNATHUS: *Myxidium immersum*, and *Zelleriella antilliensis* (Protozoa).
 13. L. SIBILATRIX: *Nyctotherus oswaldoi*, *Zelleriella magna*, and *Z. truncata* (Protozoa).
 14. L. TYPHONIUS: *Aplectana acuminata*, A. sp? of Travassos, et al., 1939, *Cosmocerca commutata*, and *Foleyella convoluta* (Nematoda); and *Opisthodiscus subclavatus* (Trematoda).
 15. L. spp?.: *Trypanosoma borrelli*, and *T. rotatorium* (Protozoa). *Oswaldocruzia pipiens* (Nematoda) has been reported from a Leptodactylid kept in a Zoological Garden in the United States.
 16. LIMNOMEDUSA MACROGLOSSA: *Myxidium immersum*, ? *Nyctotherus cordiformis*, and *Zelleriella antilliensis* (Protozoa).
 17. PALUDICOLA FALCIPES: *Cepedea rubra* (Protozoa).
 18. P. FUSCOMACULATUS: *Cosmocerca* sp? of Travassos, et al., 1939 (Nematoda); and unidentified larvae (Cestoda).
 19. PHYSALAEUM SIGNIFERUS: *Entamoeba* sp? of Chen & Stabler, 1936, *Myxidium lindoyense*, *Nyctotherus paludicola*, *Zelleriella brasiliensis*, *Z. paludicola*, and *Z. sp?* of Brumpt & Lavier, 1936 (Protozoa).
 20. PLEURODEMA (= Paludicola) BIBRONI: *Balantidium* sp? of Metcalf, 1923. *Myxidium immersum*, ? *Nyctotherus cordiformis*, *N. sp?* of Metcalf, 1923, *Trichomonas augusta*, *Zelleriella antilliensis*, *Z. paludicola*, and *Z. sp?* of Chen & Stabler, 1936 (Protozoa); and *Hannemania samboni* (Acarina).
 21. P. BRACHYOPS: *Zelleriella paludicola* (protozoa).
 22. P. BUFONINA: *Zelleriella patagoniensis* (Protozoa); and *Hannemania hobdayi* (Acarina).
 23. P. DARWINI: *Acanthocephalus lutzii* (Acanthocephala).
 24. PSEUDOPALUDICOLA AMEGHINI: *Cepedea rubra* (Protozoa).
- The Pseudinae (S. American and Caribbean forms) are represented by 20 species of 5 genera for which parasites have been reported.
1. CALYPTOCEPHALUS GAYI: *Trichomonas augusta* (Protozoa).
 2. CERATOPHRYS AMERICANA: *Myxidium immersum*, and *Nyctotherus ceratophrys* (Protozoa).
 3. C. CORNUTA: *Ascaris foecunda*, *Oswaldocruzia subauricularis*, and *Schulzia subventricosa* (Nematoda).
 4. C. DORSATA: *Oswaldocruzia filiformis*, *O. subauricularis*, and *Oxy-somatium baylisi* (Nematoda).
 5. C. ORNATA: immature *Taenia ceratophrys* (Cestoda).
 6. ELEUTHERODACTYLUS BINGHAMI: *Zelleriella binghami* (Protozoa).
 7. E. BINOTATUS: *Aplectana* sp? of Travassos, 1925 (Nematoda).
 8. E. FOOTEI: *Zelleriella cuscons* (Protozoa).
 9. E. GOLLMERI: *Aplectana pintoi*, *A. vellardi*, A. sp? of Travassos, 1925, *Cosmocerca brasiliensis*, *Oswaldocruzia subauricularis*, and *Schulzia subventricosa* (Nematoda); and *Hannemania stephensi* (Acarina).
 10. E. GÜNTHERI: *Cepedea* sp? of Metcalf, 1940 (Protozoa).
 11. E. LEPTOPUS: *Protoopalina diplocarya* (Protozoa).
 12. E. LUTEOLUS: *Protoopalina xanachana* (Protozoa).
 13. E. MILIARIS: *Aplectana vellardi*, A. sp? of Travassos, 1925, *Cosmocerca brasiliensis*, and *Schulzia subventricosa* (Nematoda); and *Zelleriella* sp? of Metcalf, 1940 (Protozoa).
 14. E. RICORDII (Florida): *Aplectana* sp? of Walton, 1940 (Nematoda); and *Hannemania penetrans* (Acarina).
 15. E. sp?: *Hannemania hylodeus* (Acarina).

16. E. sp? tadpoles: *Cepedea* sp? of Metcalf, 1940 (Protozoa).
17. PSEUDIS MANTIDACTYLA: *Myxidium immersum*, ? *Nyctotherus cordiformis*, and *Zelleriella antilleanensis* (Protozoa).
18. P. PARADOXA: *Catadiscus pygmaeus*, *Gorgoderina parvicava*, and *Haematoloechus neivai* (Trematoda).
19. TELMATOBIUS ESCOMELI: "*Abibes*" sp? of Escomel, 1929, *Hexamita brumpti*, "*Monadiens*" sp? of Escomel, 1929, *Nyctotherus* sp? of Escomel, 1929, *Opalina ranarum*, *Trichomonas batrachorum*, and *T. "hominis"* of Escomel, 1929 (Protozoa).
20. T. JELSKII: "*Abibes*" sp? of Escomel, 1929, *Hexamita brumpti*, "*Monadiens*" sp? of Escomel, 1929, *Nyctotherus* sp? of Escomel, 1929, *Opalina ranarum*, *Protoopalina longinucleata*, *Trichomonas batrachorum*, *T. "hominis"* of Escomel, 1929, *T. "intestinalis"* of Escomel, 1929, and *Zelleriella telmatobii* (Protozoa).

Examinations of members of the Rhynophryniinae (Mexican forms) have not as yet resulted in the recording of the presence of any parasitic infestations.