Supplementary table 1. Source and details of the individual species experimental data used for analysis of cercarial swimming.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Species | Origin | Morphotype | Target host | Host-searching behaviour | Habitat | Speed (mm/sec) | Temperature (ºC) | Ref |
| *Schistosoma mansoni* | Puerto Rico [1] (York) | Furcocercariae | Human | Active waiting | Freshwater | 2.1 | 22 | [1] |
|  | Puerto Rico [2] (York) | Furcocercariae | Human | Active waiting | Freshwater | 0.75 | 24 | [2] |
|  | Puerto Rico [3] (York) | Furcocercariae | Human | Active waiting | Freshwater | 1.4 | 27 | [3] |
|  | Puerto Rico [4] (York) | Furcocercariae | Human | Active waiting | Freshwater | 0.73 | 25 | [4] |
|  | Puerto Rico[5] (UCSF) | Furcocercariae | Human | Active waiting | Freshwater | 0.7 | n/k | [5] |
|  | Puerto Rico [6]  | Furcocercariae | Human | Active waiting | Freshwater | 0.46 | 25 | [6] |
|  | Liberia | Furcocercariae | Human | Active waiting | Freshwater | 1.4 | n/k | [7] |
|  | Brazil | Furcocercariae | Human | Active waiting | Freshwater | 1.04 | 25 | [8] |
| *Trichobilharzia ocellata* | Germany | Furcocercariae | Bird (aquatic) | Active waiting | Freshwater | 3.4 | 25 | [9] |
| *Bilharzia polonica* | Finland | Furcocercariae | Bird (aquatic) | Active searching | Freshwater | 0.9 | 20 | [10] |
| *Diplostomum spathaceum* | Germany | Furcocercariae | Fish | Active waiting | Freshwater | 3.7 | n/k | [21] |
|  | England | Furcocercariae | Fish | Active waiting | Freshwater | 1.25 | 22 | [11] |
| *Diplostomum pseudospathaceum* | Finland | Furcocercariae | Fish | Active waiting | Freshwater | 3.9 | 20 | [10] |
| *Posthodiplostomum cuticola* | Germany | Furcocercariae | Fish | Active waiting | Freshwater | 9.0 | 20 | [14] |
| *Transversotrema patialense* | Malaysia | Furcocercariae | Fish | Active waiting | Freshwater | 25.9 | n/k | [13] |
| *Ichthyocotylurus variegatus* | Finland | Furcocercariae | Fish | Active waiting | Freshwater | 3.9 | 20 | [10] |
| *Cercaria spinulosa* | Finland | Furcocercariae | Fish | Active waiting | Freshwater | 1.1 | 20 | [10] |
| *Aporocotylid* sp. 1 | New Zealand | Furcocercariae | Fish | Active waiting | Freshwater | 3.4 | 16 | [12] |
| *Apatemon* sp. | New Zealand | Furcocercariae | Fish | Active searching | Freshwater | 3.2 | 16 | [12] |
| *Proterometra macrostoma* | USA | Furcocercariae | Fish | Prey mimicry | Freshwater | 7.0 | 25 | [15] |
| *Alaria arisaemoides* | Canada | Furcocercariae | Tadpoles (Amphibians) | Active waiting | Freshwater | 10.0 | 21 | [16] |
| *Australapatemon minor* | Germany | Furcocercariae | Leech | Active waiting | Freshwater | 1.6 | 25 | [9] |
|  | England | Furcocercariae | Leech | Active waiting | Freshwater | 1.08 | 22 | [11] |
| *Australapatemon burti* | Finland | Furcocercariae | Leech | Active waiting | Freshwater | 0.9 | 20 | [10] |
| *Australapatemon* sp. | Finland | Furcocercariae | Leech | Active searching | Freshwater | 1.2 | 20 | [10] |
| *Cotylurus flabelliformis* | USA | Furcocercairae | Mollusc | Active searching | Freshwater | 0.98 | 26 | [17] |
| *Cotylurus brevis* | Finland | Furcocercariae | Mollusc | Active searching | Freshwater | 2.4 | 20 | [10] |
| *Echinostoma revolutum* | Germany | Echinostome | Mollusc/ Tadpoles | Active searching | Freshwater | 1.3 | 25 | [9] |
| *Echinostoma caproni* | Egypt | Echinostome | Mollusc/ Tadpoles | Active searching | Freshwater | 2.23 | 25 | [18] |
| *Echinostoma* sp.(*Cercaria spinifera*) | Germany | Echinostome | Mollusc/ Tadpoles | Active searching | Freshwater | 3.2 | 25 | [9] |
| *Echinostoma* sp. (of Fulia) | Switzerland | Echinostome | Mollusc | Active searching | Freshwater | 4.0 | n/k | [19] |
| *Echinoparyphium recurvatum* | England [1] (York) | Echinostome | Mollusc/ Tadpoles | Active searching | Freshwater | 1.33 | 19 | [20] |
|  | England [2](Egham) | Echinostome | Molluscs/ Tadpoles | Active searching | Freshwater | 0.84 | 22 | [11] |
| *Echinoparyphium aconiatum* | Switzerland | Echinostome | Mollusc | Active searching | Freshwater | 1.82 | n/k | [19] |
| *Echinoparyphium* sp. | Germany | Echinostome | Mollusc | Active searching | Freshwater | 2.5 | n/k | [21] |
| *Himasthla elongata* | White sea [1] | Echinostome | Mollusc | Active searching | Marine | 2.4 | 15 | [22] |
|  | White sea [2] | Echinostome | Mollusc | Active searching | Marine | 2.2 | 20 | [23] |
| *Himasthla rhigedana* | USA (California salt marsh) | Echinostome | External surface of crabs/molluscs | Active searching | Marine | 3.6 | 24 | [23] |
| *Hypoderaeum conoideum* | Germany | Echinostome | Molluscs/ Tadpoles | Active searching | Freshwater | 1.6 | 25 | [9] |
|  | Switzerland | Echinostome | Molluscs/ Tadpoles | Active searching | Freshwater | 1.1 | n/k | [19] |
| *Hypoderaeum* sp. | England | Echinostome | Molluscs | Active searching | Freshwater | 0.8 | 15 | [24] |
| *Cercaria ogunis* | Nigeria | Echinostome | Molluscs/ Tadpoles | Active searching | Freshwater | 3.0 | n/k | [26] |
| *Cryptocotyle lingua* | Northern Ireland [1] | Parapleurophocercous | Fish | Active waiting | Marine | 1.6 | 15 | [26] |
|  | Northern Ireland [2] | Parapleurophocercous | Fish | Active waiting | Marine | 2.7 | 20 | [27] |
|  | Northern Ireland [3] | Parapleurophocercous | Fish | Active waiting | Marine | 1.25 | 20 | [28] |
|  | Northern Ireland [4] | Parapleurophocercous | Fish | Active waiting | Marine | 1.2 | 15 | [29] |
|  | Northern Ireland [5] | Parapleurophocercous | Fish | Active waiting | Marine | 2.6 | 15 | [30] |
|  | White sea [1] | Parapleurophocercous | Fish | Active waiting | Marine | 4.8 | 15 | [22] |
|  | White sea [2] | Parapleurophocercous | Fish | Active waiting | Marine | 0.48 | 20 | [31] |
| *Haplorchis pumilio* | Taiwan | Parapleurophocercous | Fish | Active waiting | Freshwater | 2.0 | 25 | [32] |
| *Cercaria caribbea LXXI* | Jamaica | Parapleurophocercous | Fish | Prey mimicry | Marine | 2.0 | 25 | [33] |
| *Plagiochis muris* | Japan | Xiphidiocercariae | Arthropods | Active searching | Freshwater | 0.28 | 20 | [34] |
| *Plagiorchis elegans* | England | Xiphidiocercariae | Arthropods | Active searching | Freshwater | 0.43 | 19 | [20] |
| *Maritrema poulini* | New Zealand | Xiphidiocercariae | Arthropods | Active searching | Freshwater | 0.4 | 16 | [12] |
| *Maritrema subdolum* | White sea | Xiphidiocercariae | Arthropods | Active searching | Marine | 0.35 | 15 | [22] |
| *Plerogenoides medians* | Germany | Xiphidiocercariae | Arthropods | Active searching | Freshwater | 0.25 | n/k | [35] |
| *Opisthioglyphe ranae* | Poland | Xiphidiocercariae | Molluscs | Active searching | Freshwater | 1.1 | 20 | [36] |
| *Probolocoryphe lanceolata* | USA(Florida) | Xiphidiocercariae | Arthropods | Active searching | Marine | 0.59 | 24 | [37] |
| *Cercaria parvicaudata* (*Renicola* sp.) | White sea | Xiphidiocercariae | Molluscs | Active searching | Marine | 0.34 | 15 | [22] |
| *Centrocestus formosanus* | Taiwan | Pleurophocercous | Fish | Active searching | Freshwater | 0.5 | 25 | [32] |
| *Euhaplorchis* sp. | USA (Florida) | Pleurophocercous | Fish | Active waiting | Marine | 0.66 | 24 | [37] |
| *Cercaria opacocorpa* | USA | Pleurophocercous | Fish | Active waiting | Freshwater | 7.1 | 25 | [38] |
| *Fasciola hepatica* | USA | Gymnocephalous | Free-living on plant surface | Active searching | Freshwater | 1.37 | 23 | [39] |
| *Cercaria E* | USA | Gymnocephalous | n/k | Active searching | Marine | 8.0 | n/k | [40] |
| *Echinostephilla patella* | Northern Ireland | Megalurous | Mollusc | Active searching | Marine | 0.9 | 20 | [28] |
| *Parorchis acanthus* | Wales | Megalurous | External surface molluscs/amphipods | Passive waiting | Marine | 0.1 | 22 | [41] |
| *Coitocaecum parvum* | New Zealand | Cotylocercous | Amphipod | Passive waiting | Freshwater | 1.0 | 16 | [12] |
| *Cercaria setifera* | France | Trichocercous | Benthic invertebrates | Active searching | Marine | 3.6 | n/k | [42] |
| *Cercaria F* | USA | ‘Hugh-tailed monostome’ | Fish | Prey mimicry | Marine | 3.5 | n/k | [40] |

References

[1] Samuelson, J.C., Quinn, J.J., & Caulfiend, J.P. (1984). Video microscopy of swimming and secreting cercariae of *Schistosoma mansoni. Journal of Parasitology* 70, 996-999.

[2] Nuttman, C.J. (1975). The structure and behaviour of the cercaria of *Schistosoma mansoni*. PhD thesis, University of York.

[3] Lawson, J.R. (1977). The biology of the cercaria and early Schistosomulum of *Schistosoma mansoni.* PhD thesis, University of York.

[4] Carter, N.P. (1978). The host-location mechanisms of the miracidium and cercaria of *Schistosoma mansoni.* PhD thesis, University of York.

[5] Krishnamurthy, D., Katsikis, G., Bhargava, A., & Prakash, M. (2017). *Schistosoma mansoni* cercariae swim efficiently by exploiting an elastohydrodynamic coupling. *Nature Physics* 13, 266-271.

[6] Molnar, P.K., Sckrabulis, J.P., Altman, K.A., & Raffel, T.R. (2017). Metabolic theory of ecology- a practical guide to models and experiments for parasitologists. *Journal of Parasitology* 103, 423-439.

[7] Graefe, G., Hohorst, W., & Drager, H. (1967). Forked tail of the cercaria of *Schistosoma mansoni*- a rowing device. *Nature* 215, 207-208.

[8] Valle, C., Pellegrino, J., Gazzinelli, G. (1974). Influence of temperature on the backward propulsion speed of *Schistosoma mansoni* cercariae. *Journal of Parasitology* 60, 372-373.

[9] Haas, W. (1994). Physiological analyses of host-finding behaviour in trematode cercariae: Adaptations for transmission success. *Parasitology* 109, S15-S29.

[10] Santos, M.J., Karvonen, A., Pedro, J.C., Faltynkova, A., Seppala, O., & Valtonen, E.T. (2007). Qualitative and quantitative behavioural traits in a community of furcocercariae trematodes: Tools for species separation? *Journal of Parasitology* 93, 1319-1323.

[11] Morley unpublished observations

[12] Selbach, C., & Poulin, R. (2018). Parasites in space and time: a novel method to assess and illustrate host-searching behaviour of trematode cercariae. *Parasitology* 145, 1469-1474.

[13] Whitfield, P.J., Anderson, R.M., & Bundy D.A.P. (1977). Experimental investigations on the behaviour of the cercariae of an ectoparasitic digenean *Transversotrema patialense*: general activity patterns. *Parasitology* 75, 9-30.

[14] Dönges, J. (1964). Der lebenszyklus von *Posthodiplostomum cuticola* (v. Nordmann 1832) Dubois 1936 (Trematoda, Diplostomatidae). *Zeitschrift fur Parasitenkunde* 24, 169-248.

[15] Prior, D.J. & Uglem, G.L. (1979). Behavioural and physiological aspects of swimming in cercariae of the digenetic trematode, *Proterometra macrostoma. Journal of Experimental Biology* 83, 239-247.

[16] Pearson, J.C. (1956). Studies on the life cycles and morphology of the larval stages of *Alaria arisaemoides* Augustine and Uribe, 1927 and *Alaria canis* LaRue and Fallis 1936 (Trematoda: Diplostomidae). *Canadian Journal of Zoology* 34, 295-387.

[17] Campbell, R.A. (1997). Host-finding behaviour of *Cotylurus flabelliformis* (Trematoda: Strigeidae) cercariae for snail hosts. *Folia Parasitologica* 44, 199-204.

[18] Meyrowitsch, D., Christensen, N.O. & Hindsbo, O. (1991). Effects of temperature and host density on the snail-finding capacity of cercariae of *Echinostoma caproni* (Digenea: Echinostomatidae). *Parasitology* 102, 391-395.

[19] Dubois, G. (1928). Les cercaires de la region de Neuchatel. Bulletin de la Societe Neuchateloise des Sciences Naturelles 53, 1-177.

[20] Dixon, M.D. (1984). *Strategies of host location employed by larval trematodes*. PhD thesis, University of York.

[21] Graef, G. & Burkert, D.G. (1972). Zur lokomotionsmechanik von Diplostomatiden- unde Echinostomatiden-cercarien (Trematoda). *Zoologischer Anzeiger* 188, 366-369.

[22] Prokofiev, V.V. (2005). Patterns of swimming of cercariae in some Trematode species. *Parazitologiya* 39, 204-220.

[23] Fingerut, J.T., Zimmer, C.A., & Zimmer, R.K. (2003). Larval swimming overpowers turbulent mixing and facilitates transmission of a marine parasite. *Ecology* 84, 2502-2515.

[24] Young, M.R. (1973). Studies on the population dynamics of some digeneans parasitizing molluscs in the Worcester-Birmingham canal. PhD thesis, University of Birmingham

[25] Dönges, J. (1977). Cercaria ogunis n. sp. (Echinostomatidae) aus Bulinus globosus in Westafrika. Zeitschrift fur Parasitenkunde 52, 297-309.

[26] Rea, J.G., & Irwin, S.W.B. (1992). The effects of age, temperature, light quality and wavelength on the swimming behaviour of the cercariae of *Cryptocotyle lingua* (Digenea: Heterophyidae). *Parasitology* 105, 131-137.

[27] Rea, J.G., & Irwin, S.W.B. (1995). The effects of age, temperature and shadow stimuli on activity patterns of the cercariae of *Cryptocotyle lingua* (Digenea: Heterophyidae). *Parasitology* 111, 95-101.

[28] Rea, J.G., & Irwin, S.W.B. (2001). Fun with flukes: the use of ICT in the study of larval trematode behaviour. *Journal of Biological Education* 36, 35-41.

[29] Cross, M.A., Irwin, S.W.B., & Fitzpatrick, S.M. (2001). Effects of heavy metal pollution on swimming and longevity in cercariae of *Cryptocotyle lingua* (Digenea: Heterophyidae). *Parasitology* 123, 499-507.

[30] Cross, M.A., Irwin, S.W.B., & Fitzpatrick, S.M. (2005). Effects of host habitat quality on the viability of *Cryptocotyle lingua* (Trematoda: Digenea) cercariae. *Parasitology* 130, 195-201.

[31] Tolstenkov, O.O., Prokofiev, V.V., Pleskacheva, M.V., Gustafsson, M.K.S., & Zhukovskaya, M.I. (2017). Age and serotonin effects on locomotion in marine trematode cercariae. *Journal of Evolutionary Biochemistry & Physiology* 53, 135-142.

[32] Lo, C.-T., & Lee, K.-M. (1996). Infectivity of the cercariae of *Centrocestus formosanus* and *Haplorchis pumilio* (Digenea: Heterophyidae) in *Cyprinus carpio. Zoological Studies* 35, 305-309.

[33] Young, L.E., Young, R.E., & Bundy, D.A.P. (1987). Photoreceptor evoked potentials and phototactic behaviour in *Cercaria caribbea LXXI* Cable. *Comparative Biochemistry & Physiology* 88A, 619-624.

[34] Yamashita, J. (1952). Studies on the cercaria of the rat trematode, *Plagiorchis muris* (Tanabe). *Journal of the Faculty of Agriculture Hokkaido University* 48, 305-358.

[35] Neuhaus, W. (1940). Entwicklung und biologie von *Pleurogenes medians* Olss. *Zoologische Jahrbucher. Abteilung 1. Systematik (Okologie), Geographie und Biologie* 74, 207-242.

[36] Styczynska-Jurewicz, E. (1961). On the geotaxis, invasivity and span of life of *Opistioglyphe ranae* Duj. Cercariae. *Bulletin de l’Academie Polonaise des Sciences* 9, 31-35.

[37] Fitzpatrick, K.B., Smith, N.F., & Cohen, J.H. (2016). Swimming behaviour of marine cercariae: effects of gravity and hydrostatic pressure. *Journal of Experimental Marine Biology & Ecology* 476, 8-14

[38] Wheeler, N.C. (1939). A comparative study on the behaviour of four species of Pleurolophocercous cercariae. *Journal of Parasitology* 25 343-353.

[39] Coil, W.H. (1984). An analysis of swimming by the cercariae of *Fasciola hepatica* using high speed cinematography. *Proceedings of the Helminthological Society of Washington* 51, 293-296.

[40] Miller, H.M. (1926). Behavior studies on Tortugas larval trematodes with notes on the morphology of two additional species. *Yearbook of the Carnegie Institute of Washington* 25, 243-247.

[41] Rees, G. (1971). Locomotion of the cercaria of *Parorchis acanthus*, Nicoll and the ultrastructure of the tail. *Parasitology* 62, 489-503.

[42] Bartoli, P. (1984). Redescription de Cercaria setifera F.S. Monticelli, 1914 (nec J. Muller)(Trematoda) parasite de *Conus ventricosus* Hwass; comparaison avec quelques cercaires optalmotrichocerques de Mediterranee occidentale. *Annales de parasitology humaine et comparee* 59, 161-176.