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BIBLIOGRAPHY

Adams, E. N. 1972. Concensus techniques and the comparison of taxonomic trees. *Systematic Zoology*, **21**: 390-397.

Afifi, A. A. & Azeni, S. P. 1979. *Statistical Analysis. A Computer Oriented Approach*. Sydney: Academic press, Inc.

Allen, G. R. 1980. A generic classification of the rainbowfishes (family Melanotaeniidae). *Records of the Western Australian Museum.*, **8**: 449-90.

Allen, G. R. 1989a. *Freshwater Fishes of Australia*. New York: T.F.H.

Allen, G. R. 1989b. Lake Eacham rainbowfish rediscovered? *Fishes of Sahul*, **5**: 217-219.

Allen, G. R. 1995. *Rainbowfishes: In Nature and in the Aquarium*. Melle, Germany: Tetra-Verlag.

Allen, G. R. & Cross, N. J. 1982. *Rainbowfishes of Australia and Papua-New Guinea*. New Jersey: T.F.H.Publications Inc.

Allen, G. R. & Hoese, D. F. 1980. A collection of fishes from Cape York Peninsula, Australia. *Journal of the Royal Society of Western Australia*, **63**: 53-61.

Allen, G. R., Midgley, S. H. & Allen, M. 2002. *Field Guide to the Freshwater Fishes of Australia.* Perth: Western Australian Museum.

Allen, G. R. & Renyaan, S. J. 1998. Three new species of rainbowfishes (Melanotaeniidae) from Irian Jaya, Indonesia. *Journal of Ichthyology and Aquatic Biology*, **3**: 69-80.

Anderberg, M. R. 1973. *Cluster Analysis for Applications*. New York: Academic Press.

Anon. 2001. *SPSS for Windows (Version 10.1).* Chicago Il.: SPSS Inc.

Anthony, D. 1999. *Understanding Advanced Statistics. A Guide for Nurses and Health Care Researchers.* Sydney: Churchill Livingstone.

Archie, J. W. 1985. Methods for coding variable morphological features for numerical taxonomic analysis. *Systematic Zoology*, **34**: 326-345.

Barker, D. E. & Cone, D. K. 2000. Occurrence of *Ergasilus celestis* (Copepoda) and *Pseudodactylogryrus anguillae* (Monogenea) among wild eels (*Anguilla rostrata*) in relation to stream flow, pH and temperature and recommendations for controlling their transmission among captive eels. *Aquaculture*, **187**: 261-274.

Barse, A. M. 1998. Gill parasites of mummichogs, *Fundulus heteroclitus* (Teleostei : Cyprinodontidae): Effects of season, locality, and host sex and size. *Journal of Parasitology*, **84**: 236-244.

Baum, B. R. 1988. A simple procedure for establishing discrete characters from measurement data, applicable to cladistics. *Taxon*, **37**: 63-70.

Beverley-Burton, M. 1995. Origins of the monogenea of selected major taxa of nearctic freshwater fishes. *Canadian Journal of Fisheries & Aquatic Sciences*, **52**: 24-34.

Beverley-Burton, M. & Klassen, G. J. 1990. New approaches to the systematics of the ancyrocephalid monogenea from Nearctic freshwater fishes. *Journal of Parasitology*, **76**: 1-21.

Beverley-Burton, M. & Suriano, D. M. 1980a. *Cleidodiscus robustus* Mueller, 1934 (Monogenea: Ancyrocephalinae) from *Lepomis gibbosus* L. (Pisces: Centrarchidae) in Ontario, Canada: anatomy and systematic position. *Canadian Journal of Zoology*, **58**: 654-660.

Beverley-Burton, M. & Suriano, D. M. 1980b. *Haplocleidus dispar* (Mueller, 1936) and *Pterocleidus acer* (Mueller, 1936) (Monogenea: Ancyrocephalinae) from *Lepomis gibbosus* L. (Pisces: Centrarchidae) in Ontario, Canada: anatomy and systematic position. *Canadian Journal of Zoology*, **58**: 661-669.

Blair, D., Davis, G. M. & Wu, B. 2001. Evolutionary relationships between trematodes and snails emphasising schistosomes and paragonomids. *Parasitology*, **123**: S229-S243.

Boeger, W. A. 1988. *Studies on the Phylogeny, Coevolution and Taxonomy of the Class Monogenoidea (Bychowsky, 1937)*. [Ph.D. Dissertation] Pocatello: Idaho State University, pp. 399.

Boeger, W. A. & Kritsky, D. C. 1997. Coevolution of the Monogenoidea (Platyhelminthes) based on a revised hypothesis of parasite phylogeny. *International Journal for Parasitology*, **27**: 1495-1511.

Brooks, D. R. 1979. Testing the context and extent of host-parasite coevolution. *Systematic Parasitology*, **28**: 299-307.

Brooks, D. R. 1981. Hennig's parasitological method: a proposed solution. *Systematic Zoology*, **30**: 229-249.

Brooks, D. R. 1987. Analysis of host-parasite co-evolution. *International Journal for Parasitology*, **17**: 291-297.

Brooks, D. R. 1990. Parsimony analysis in historical biogeography and coevolution: Methodological and theoretical update. *Systematic Zoology*, **39**: 14-30.

Brooks, D. R., Dowling, A. P. G., van Veller, M. G. P. & Hoberg, E. P. 2004. Ending a decade of deception: a valiant failure, a not-so-valiant failure, and a success story. *Cladistics*, **20**: 32-46.

Brooks, D. R. & McLennan, D. A. 1993. *Parascript: Parasites and the Language of Evolution*. Washington: Smithsonian Institution Press.

Bruno, D. W., Collins, C. M., Cunningham, C. O. & MacKenzie, K. 2001. *Gyrodactyloides bychowskii* (Monogenea: Gyrodactylidae) from sea-caged Atlantic salmon *Salmo salar* in Scotland: occurrence and ribosomal RNA sequence analysis. *Diseases of Aquatic Organisms*, **45**: 191-196.

Bush, A. O. & Holmes, J. C. 1986. Intestinal parasites of the lesser scaup duck: patterns of association. *Canadian Journal of Zoology*, **64**: 132-141.

Bush, A. O., Lafferty, K. D., Lotz, J. M. & Shostak, A. W. 1997. Parasitology meets ecology on its own terms: Margolis *et al*. revisited. *Journal of Parasitology*, **83**: 575-583.

Bychowsky, B. E. 1957. *Monogenetic trematodes, their systematics and phylogeny.* [Translation from Russian, AIBS, Washington, D. C.]: Akad. Nauk. SSSR. 1-509.

Bychowsky, B. E. & Nagibina, L. F. 1978. The revision of Ancyrocephalinae Bychowsky, 1937 (Monogenoidea) [In Russian]. *Parazitologiceskii Sbornik*, **28**: 5-15.

Cable, J., Harris, P. D. & Bakke, T. A. 2000. Population growth of *Gyrodactylus salaris* (Monogenea) on Norwegian and Baltic Atlantic salmon (*Salmo salar*) stocks. *Parasitology*, **121**: 621-629.

Cable, J., Harris, P. D., Tinsley, R. C. & Lazarus, C. M. 1999. Phylogenetic analysis of *Gyrodactylus* spp. (Platyhelminthes : Monogenea) using ribosomal DNA sequences. *Canadian Journal of Zoology-Revue Canadienne De Zoologie*, **77**: 1439-1449.

Carney, J. P. & Dick, T. A. 2000. Parasite biogeography: A review of the origins and ideas with specific examples from Holarctic fishes. *Vie Et Milieu-Life and Environment*, **50**: 221-243.

Carpenter, J. M. 1996. Forum: Uninformative bootstrapping. *Cladistics*, **12**: 177-81.

Charleston, M. A. 1998. Jungles: a new solution to the host/parasite phylogeny reconciliation problem. *Mathematical Biosciences*, **149**: 191-223.

Charleston, M. A. & Page, R. D. M. 2002. TREEMAP 2.0. A Macintosh program for the analysis of how dependent phylogenies are related by cophylogeny mapping. Department of Zoology, University of Oxford, Oxford.

Chisholm, L. A., Whittington, I. D. & Schokaert, E. 1998. Morphology and development of the haptors among the Monocotylidae (Monogenea). *Hydrobiologia*, **383**: 251-261.

Choudhury, A. & Dick, T. A. 2001. Sturgeons (Chondrostei: Acipenseridae) and their metazoan parasites: patterns and processes in historical biogeography. *Journal of Biogeography*, **28**: 1411-1439.

Chubb, J. C. 1979. Seasonal occurence of helminths in freshwater fishes. Part I. Monogenea. *Advances in Parasitology*, **15**: 141-313.

Collins, C. M. & Cunningham, C. O. 2000. Characterization of the *Gyrodactylus salaris* Malmberg, 1957 (Platyhelminthes: Monogenea) ribosomal intergenic spacer (IGS) DNA. *Parasitology*, **121**: 555-563.

Corlis, D. 2004. Four new genera of Monogenea (Dactylogyridae) from the gills of Australian atheriniform freshwater fishes. *Memoirs of the Queensland Museum*, **49**: 537-571.

Coventry, R. J., Campbell, J. B., Douglas, I., Harvey, N., Kershaw, A. P., Oliver, J., Phipps, C. V. G. & Pye, K. 1980. The Quaternary of northeastern Australia. In: *The Geology and Geophysics of North Eastern Australia* (Henderson, R. A. & Stephenson, P. J., Eds.) pp. 375-385. Brisbane: Geological Society of Australia.

Cremonte, F. & Sardella, N. H. 1997. The parasite fauna of *Scomber japonicus* Houttuyn, 1782 (Pisces: Scombridae) in two zones of the Argentine Sea. *Fisheries Research*, **31**: 1-9.

Cribb, T. H., Bray, R. A., Barker, S. C., Adlard, R. D. & Anderson, G. R. 1994. Ecology and diversity of digenean trematodes of reef and inshore fishes of Queensland. *International Journal for Parasitology*, **24**: 851-860.

Crowley, L. E. I. M. 1990. Biogeography of the endemic freshwater fish *Craterocephalus* (Family Atherinidae). *Memoirs of the Queensland Museum*, **28**: 89-98.

Crowley, L. E. I. M. & Ivanstoff, W. 1991. Genetic similarity among populations of rainbowfishes (Pisces: Melanotaenidae) from the Atherton Tablelands. *Ichthyologial Exploration of Freshwaters*, **2**: 129-37.

Cunningham, C. O. 1997. Species variation within the internal transcribed spacer (ITS) region of *Gyrodactylus* (Monogenea: Gyrodactylidae) ribosomal RNA genes. *Journal of Parasitology*, **83**: 215-219.

Cunningham, C. O., Aliesky, H. & Collins, C. M. 2000. Sequence and secondary structure variation in the *Gyrodactylus* (Platyhelminthes : Monogenea) ribosomal RNA gene array. *Journal of Parasitology*, **86**: 567-576.

Cunningham, C. O. & Mo, T. A. 1997. Random amplified polymorphic DNA (RAPD) analysis of three Norwegian *Gyrodactylus salaris* populations (Monogenea; Gyrodactylidae). *Journal of Parasitology*, **83**: 311-314.

Cunningham, C. O., Mo, T. A., Collins, C. M., Buchmann, K., Thiery, R., Blanc, G. & Lautraite, A. 2001. Redescription of *Gyrodactylus teuchis* Lautraite, Blanc, Thiery, Daniel & Vigneulle, 1999 (Monogenea : Gyrodactylidae); a species identified by ribosomal RNA sequence. *Systematic Parasitology*, **48**: 141-150.

Denham, K. L. & Long, J. 1999. Occurrence of *Gyrodactylus thymalli* Zitnan, 1960 on grayling, *Thymallus thymallus* (L.), in England. *Journal of Fish Diseases*, **22**: 247-252.

Desdevises, Y., Jovelin, R., Jousson, O. & Morand, S. 2000. Comparison of ribosomal DNA sequences of *Lamellodiscus* spp, (Monogenea, Diplectanidae) parasitising *Pagellus* (Sparidae, Teleostei) in the North Mediterranean Sea: species divergence and coevolutionary interactions. *International Journal for Parasitology*, **30**: 741-746.

Dmitrieva, E. V. & Dimitrov, G. 2002. Variability in the taxonomic characters of Black Sea gyrodactylids (Monogenea). *Systematic Parasitology*, **51**: 199-206.

Dobson, A. P. 1985. The population dynamics of competition between parasites. *Parasitology*, **91**: 317-347.

Donoghue, M. J. & Sanderson, M. J. 1992. The suitability of molecular and morphological evidence in reconstructing plant phylogeny. In: *Molecular Systematics of Plants* (Soltis, P., Soltis, D. & Doyle, J., Eds.) pp. 340-68. New York: Chapman & Hall.

Dowling, A. P. G. 2002. Testing the accuracy of TreeMap and Brooks parsimony analyses of coevolutionary patterns using artificial associations. *Cladistics*, **18**: 416-435.

Dowling, A. P. G., van Veller, M. G. P., Hoberg, E. P. & Brooks, D. A. 2003. A priori and a posteriori methods in comparative evolutionary studies of host-parasite associations. *Cladistics*, **19**: 240-253.

Dunn, G. & Everitt, B. S. 1982. *An introduction to Mathematical Taxonomy*. Cambridge: Cambridge University Press.

Dyer, B. S. & Chernoff, B. 1996. Phylogenetic relationships among atheriniform fishes (Teleostei: Atherinomorpha). *Zoological Journal of the Linnaean Society*, **117**: 1-69.

El Hafidi, F., Berrada-Rkhami, O., Benazzou, T. & Gabrion, C. 1998. Microhabitat distribution and coexistence of Microcotylidae (Monogenea) on the gills of the striped mullet *Mugil cephalus*: chance or competition? *Parasitology Research*, **84**: 315-320.

El-Naggar, M. M. & Serag, H. M. 1985. The monogenean *Quadriacanthus kearni n. sp*. and a report of *Q. clariadis clariadis* (Paperna, 1979) on the gills of *Clarius lazera* in Nile Delta. *Journal. Egyptian Society of Parasitology*, **15**: 479-492.

Ergens, R. 1969. The suitability of ammonium picrate-glycerine in preparing slides of lower Monogenoidea. *Folia Parasitologia*, **16**: 320.

Ergens, R. 1976. Variability of hard parts of haptor of two species of *Gyrodactylus* Nordmann, 1832 (Monogenoidea) from *Phoxinus phoxinus* (L.). *Folia Parasitologica*, **23**: 111-126.

Ergens, R. 1981. Variability of hard parts of haptor in *Gyrodactylus truttae* Glasser, 1974 (Gyrodactylidae: Monogenea). *Folia Parasitologica*, **28**: 37-42.

Ergens, R. 1991. Variability of the hard parts of opisthapter of *Gyrodactylus leucisci* Žitnan, 1964 Monogenea, Gyrodactylidae. *Folia Parasitologica*, **38**: 23-28.

Ergens, R. & Gelnar, M. 1985. Experimental verification of the effect of temperature on the size of hard parts of haptor of *Gyrodactylus katharineri* Malmberg, 1964 (Monogenea). *Folia Parasitologica*, **32**: 377-380.

Euzet, L. & Combes, C. 1980. Les problèmes de l'espèce chez les animale parasites. *Mèm Soc. Zoo Fr*, **3**: 239-285.

Felsenstein, J. 1995. PHYLIP: *Phylogeny Inference Package*. Seattle: University of Washington.

Ferdig, M. T., McDowell, M. A., Janovy, J. J. & Clopton, R. E. 1993. Patterns of morphological variation of *Salsuginus yutanensis* (Monogenea: Ancyrocephalidae) over space and time. *Journal of Parasitology*, **79**: 744-750.

Fletcher, A. S. & Whittington, I. D. 1998. A parasite-host checklist for Monogenea from freshwater fishes in Australia, with comments on biodiversity. *Systematic Parasitology*, **41**: 159-168.

Garfias, M. B. M. & de Leon, G. P. P. 1998. Phylogenetic relationships within Cynoscionicola (Monogenea: Microcotylidae). *Revista De Biologia Tropical*, **46**: 355-367.

Gauch, H. G. J. 1982. *Multivariate Analysis in Ecology*. Cambridge: Cambridge University Press.

Geets, A., Appleby, C. & Ollevier, F. 1999. Host-dependent and seasonal variation in opisthaptoral hard parts of *Gyrodactylus cf. arcuatus* from three *Pomatoschistus* spp. and *G. arcuatus* from *Gasterosteus aculeatus*: a multivariate approach. *Parasitology*, **119**: 27-40.

Geets, A., Coene, H. & Ollevier, F. 1997. Ectoparasites of the whitespotted rabbitfish, *Siganus sutor* (Valenciennes, 1835) off the Kenyan Coast: Distribution within the host population and site selection on the gills. *Parasitology*, **115**: 69-79.

Gerasev, P. I. 1995. About independent changes of the characters in species of the genus *Dactylogyrus* (Monogenea: Dactylogyridae). *Parazitologiya*, **29**: 538-546.

Guégan, J. F. & Agnèse, J. F. 1991. Parasite evolutionary events inferred from host phylogeny: the case of *Labeo* species (Teleostei: Cyprinidae) and their dactylogyrid parasites (Monogenea: Dactylogyridae). *Canadian Journal of Zoology*, **69**: 595-603.

Guégan, J. F. & Hugueny, B. 1994. A nested parasite species subset pattern in tropical fish: host as major determinant of parasite infracommunity structure. *Oecologia*, **100**: 184-189.

Gussev, A. V. 1973. Freshwater Indian Monogenoidea. Principles of systematics, analysis of the world faunas and their evolution. *Indian Journal of Helminthology*, **25 & 26**: 1-241.

Gussev, A. V. 1976. Systematics, composition of the Indian fauna, zoogeography and evolution of Monogenoidea from freshwater fishes. *Tru. Biol. Poch. Inst. Nova. Ser.*, **35**: 5-32.

Gussev, A. V. & Kulemina, I. V. 1971. Analysis and variability of characters, behaviour and development's cycle of monogeneans from the age of host. *Parazitologiya*, **5**: 320-329.

Gutierrez, P. A. 2001. Monogenean community structure on the gills of *Pimelodus albicans* from Río de la Plata (Argentina): a comparative approach. *Parasitology*, **122**: 465-470.

Gutierrez, P. A. & Martorelli, S. R. 1999. The structure of the monogenean community on the gills of *Pimelodus maculatus* in Rio de la Plata (Argentina). *Parasitology*, **119**: 177-182.

Hafner, M. S. & Nadler, S. A. 1988. Phylogenetic trees support the coevolution of parasites and their hosts. *Nature*, **332**: 258-259.

Hafner, M. S. & Nadler, S. A. 1990. Cospeciation in host-parasite assemblages: Comparative analysis of rates of evolution and timing of cospeciation events. *Systematic Zoology*, **39**: 192-204.

Hanski, I. 1981. Co-existence of competitors inpatchy environments with and without predators. *Oikos*, **37**: 306-312.

Hanski, I. 1982. Dynamics of regional abundance: The core and satelite species hypothesis. *Oikos*, **38**: 210-221.

Hanski, I. & Gilpin, M. 1991. Metapopulation dynamics. *Biological Journal of the Linnaean Society*, **42**: 3-16.

Hartvigsen, R. & Halvorsen, O. 1993. Common and rare trout species parasites in a small landscape system. *Parasitology*, **106**: 101-105.

Hartvigsen, R. & Halvorsen, O. 1994. Spatial patterns in the abundance and distribution of parasites of freshwater fish. *Parasitology Today*, **10**: 28-31.

Haukisalmi, V. & Henttonen, H. 1998. Analysing interspecific associations in parasites: alternative methods and effects of sampling heterogeneity. *Oecologia*, **16**: 565-574.

Hennig, W. 1966. *Phylogenetic Systematics.* University of Illinois Press.: Urbana.

Holland, C. V. 1984. Interactions between *Moniliformis dubius* (Acanthocephala) and *Nippostrogylus* (Nematoda) in the small intestine of laboratory rats. *Parasitology*, **88**: 303-315.

Howell, D. C. 2002. *Statistical Methods for Psychology*. Pacific Grove, USA: Duxbury Thomson Learning.

Huelsenbeck, J. P., Rannala, B. & Yang, Z. H. 1997. Statistical tests of host-parasite cospeciation. *Evolution*, **51**: 410-419.

Humason, G. L. 1979. *Animal tissue techniques.* San Francisco: W. H. Freeman and Co.

Hurwood, D. A. & Hughes, J. M. 2001. Historical interdrainage dispersal of eastern rainbowfish from the Atherton Tableland, north-eastern Australia. *Journal of Fish Biology*, **58**: 1125-1136.

Huyse, T. & Volckaert, F. A. M. 2002. Identification of a host-associated species complex using molecular and morphometric analyses, with the description of *Gyrodactylus rugiensoides* n. sp. (Gyrodactylidae, Monogenea). *International Journal for Parasitology*, **32**: 907-919.

Jackson, J. A. 1999. Analysis of parasite host-switching: limitations on the use of phylogenies. *Parasitology*, **119**: S111-S123.

Jackson, J. A. & Tinsley, R. C. 1995. Sclerite growth and morphometric variation in *Gyrdicotylus gallieni* Vercammen-Grandjean, 1960 (Monogenea: Gyrodactylidae) from *Xenopus laevis laevis* (Anura). *Systematic Parasitology*, **31**: 1-9.

Jardine, N. & Sibson, R. 1971. *Mathematical Taxonomy*. Sydney: John Wiley & Sons.Ltd.

Johnson, K. P., Drown, D. M. & Clayton, D. H. 2001. A data based parsimony method of cophylogenetic analysis. *Zoologica Scripta*, **30**: 79-87.

Johnston, T. H. & Tiegs, W. O. 1922. New gyrodactyloid trematodes from Australian fishes, together with a reclassification of the superfamily Gyrodactyloidea. *Proceedings of the Linnaean Society of New South Wales*, **47**: 83-131.

Kearn, G. C. 1966. The adhesive mechanism of the monogenean parasite *Tetraonchus monenteron* from the gills of the pike (*Esox lucius*). *Parasitology*, **56**: 505-510.

Kennedy, C. R. 2001. Metapopulation and community dynamics of helminth parasites of eels *Anguilla anguilla* in the River Exe system. *Parasitology*, **122**: 689-698.

Kennedy, C. R. & Bush, A. O. 1992. Species richness in helminth communities: the importance of multiple congeners. *Parasitology*, **104**: 189-197.

Kim, K. H., Ahn, K. J. & Kim, C. S. 2001. Seasonal abundances of *Prosomicrocotyla gotoi* (Monogenea) and *Opecoelus sphaericus* (Digenea) from greenlings *Hexagrammos otakii* in a southern coastal area in Korea. *Aquaculture*, **192**: 147-153.

Klassen, G. J. 1991. Revision of *Haliotrema* species (Monogenea: Ancyrocephalidae) from Atlantic boxfishes (Tetraodontiformes: Ostraciinae): morphology, morphometrics and distribution. *Canadian Journal of Zoology*, **69**: 2523-2539.

Klassen, G. J. 1992. *Phylogeny and biogeography of ostraciine boxfishes (Tetraodontiformes: Ostraciidae) and their gill parasitic Haliotrema species (Monogenea: Ancyrocephalidae); A study in host-parasite coevolution*. [Ph. D. Dissertation.] Toronto: University of Toronto., pp. 399.

Klassen, G. J. 1994a. On the monophyly of *Haliotrema* species (monogenea, ancyrocephalidae) from boxfishes (tetraodontiformes, ostraciidae): relationships within the bodiani group. *Journal of Parasitology*, **80**: 611-619.

Klassen, G. J. 1994b. Phylogeny of *Haliotrema* species (Monogenea: Ancyrocephalidae) from boxfishes (Tetraodontiformes: Ostraciidae): are *Haliotrema* species from boxfishes monophyletic? *Journal of Parasitology*, **80**: 596-610.

Klassen, G. J. & Beverley-Burton, M. 1988. North American freshwater ancyrocephalids (Monogenea) with articulating haptoral bars: phylogeny reconstruction. *Systematic Parasitology*, **11**: 49-57.

Kritsky, D. C., Boeger, W. A. & Jegu, M. 1997. Neotropical monogenoidea .29. Ancyrocephalinae (Dactylogyridae) of Piranha and their relatives (Teleostei, Serrasalmidae) from Brazil: Species of Amphithecium Boeger and Kritsky, 1988, Heterothecium gen n and Pithanothecium gen n. *Journal of the Helminthological Society of Washington*, **64**: 25-54.

Kritsky, D. C., Boeger, W. A. & Thatcher, V. E. 1985. Neotropical Monogenea. 7. Parasites of the Pirarucu, *Arapaima gigas* (Cuvier), with descriptions of two new species and redescription of *Dawestrema cycloancistrium* Price & Nowlan, 1967 (Dactylogyridae: Ancyrocephalinae). *Proceedings of the Biological Society of Washington*, **98**: 321-331.

Lambert, A. & El-gharbi, S. 1995. Monogenean host specificity as a biological and taxonomic indicator for fish. *Biological Conservation*, **72**: 227-235.

Le Brun, N., Renaud, F., Berrebi, P. & Lambert, A. 1992. Hybrid zones and host-parasite relationships effect on the evolution of parasitic specificity. *Evolution*, **46**: 56-61.

Legendre, L. & Legendre, P. 1998. *Numerical Ecology*. New York: Elsevier.

Legendre, P. & Legendre, L. 1983. *Numerical ecology*. New York: Elsevier Scientific Pub. Co.

Levins, R. 1969. Some demographic and genetic consequences of environmental heterogeneity for biological control. *Bulletin of the Entomological Society America*, **15**: 237-240.

Lilliefors, H. W. 1967. The Kolmogorov-Smirnov test for normality with mean and variance unknown. *Journal of the American Statistics Association*, **62**: 399-402.

Lim, L. H. S. 1987. *Distribution and diversity of monogeneans in freshwater fishes of Peninsula Malaysia*. [Ph. D. Dissertation] Kuala Lumpur: University of Malaya, pp. 381.

Littlewood, D. T. J., Rohde, K. & Clough, K. A. 1997. Parasite speciation within or between host species? Phylogenetic evidence from site-specific polystome Monogeneans. *International Journal for Parasitology*, **27**: 1289-1297.

Llewellyn, J. & Simmons, J. E. 1984. The attachment of the monogenean parasite *Callorhyncicola multitesticulatus* to the gills of its holocephalan host *Callorhyncus millii*. *International Journal for Parasitology*, **14**: 191-196.

Lo, C. M. & Morand, S. 2000. Spatial distribution and coexistence of monogenean gill parasites inhabiting two damselfishes from Moorea island in French Polynesia. *Journal of Helminthology*, **74**: 329-336.

Lotz, J. M. & Font, W. F. 1991. The role of positive and negative interspecific associations in the organization of communities of intestinal helminths of bats. *Parasitology*, **103**: 127-138.

Lotz, J. M. & Font, W. F. 1994. Excess positive associations in communities of intestinal helminths of bats: a refined null hypothesis and a test of the facilitation hypothesis. *Journal of Parasitology*, **80**: 398-413.

Luque, J. L. 1996. Distribution and associations in communities of ectoparasitic metazoans in marine sciaenid fishes from Peru. *Revista De Biologia Tropical*, **44**: 383-390.

MacArthur, R. H. & Wilson, E. O. 1967. *The Theory of Island Biogeography*. Princeton, N.J: Princeton University Press.

Maddison, W. P. & Maddison, D. R. 1992. *Maclade; Analysis of Phylogeny and Character Evolution.* Sinauer Associates, Inc. Sunderland: Massachusetts.

Malmberg, G. 1970. The excretory systems and the marginal hooks as a basis for the systematics of *Gyrodactylus* (Trematoda, Monogenea). *Arkiv foer Zoologi Series 2.*, **23**: 1-235.

Manter, H. W. 1955. The zoogeography of trematodes of marine fishes. *Experimental Parasitology*, **4**: 62-86.

Matejusová, I., Gelnar, M., McBeath, A. J. A., Collins, C. M. & Cunningham, C. O. 2001a. Molecular markers for gyrodactylids (Gyrodactylidae: Monogenea) from five fish families (Teleostei). *International Journal for Parasitology*, **31**: 738-745.

Matejusová, I., Koubkova, B., D'Amelio, S. & Cunningham, C. O. 2001b. Genetic characterization of six species of diplozoids (Monogenea; Diplozoidae). *Parasitology*, **123**: 465-474.

Matejusová, I., Morand, S. & Gelnar, M. 2000. Nestedness in assemblages of gyrodactylids (Monogenea: Gyrodactylidea) parasitising two species of cyprinid - with reference to generalists and specialists. *International Journal for Parasitology*, **30**: 1153-1158.

Mayr, E. & Ashlock, P. H. 1991. *Principles of Systematic Zoology*. New York: McGraw-Hill, Inc.

McGuigan, K. L. 2001. An addition to the rainbowfish (Melanotaeniidae) fauna of North Queensland. *Memoirs of the Queensland Museum*, **46**: 647-655.

McGuigan, K. L., Zhu, D., Allen, G. R. & Moritz, C. 2000. Phylogenetic relationships and historical biogeography of melanotaeniid fishes in Australia and New Guinea. *Marine and Freshwater Research*, **51**: 713-723.

Merrick, J. R. & Schmida, G. E. 1984. *Australian freshwater fishes: biology and management*. Netley: Griffith Press Ltd.

Milligan, G. W. 1981. A review of Monte Carlo tests of cluster analysis. *Multivariate Behav. res*, **16**

Mizelle, J. D. 1936. New species of trematodes from the gills of Illinois fishes. *American Midland Naturalist*, **17**: 785-806.

Mizelle, J. D. & Hughes, R. C. 1938. The North American fresh-water Tetraonchinae. *American Midland Naturalist*, **20**: 341-353.

Mizelle, J. D., LaGrave, D. R. & O'Shaughnessy, R. P. 1943. Studies on monogenetic trematodes. IX. Host specificity of *Pomoxis* Tetraonchinae. *American Midland Naturalist*, **29**: 730-731.

Mo, T. A. 1991. Seasonal variation of opisthaptoral hard parts of *Gyrodactylus salaris* Malmberg, (Monogenea: Gyrodactylidae) on parr of Atlantic salmon, *Salmo salar* L. in the River Batnfjordselva. Norway. *Systematic Parasitology*, **19**: 231-240.

Mollaret, I., Jamieson, B. G. M. & Justine, J. L. 2000. Phylogeny of the Monopisthocotylea and Polyopisthocotylea (Platyhelminthes) inferred from 28S rDNA sequences. *International Journal for Parasitology*, **30**: 171-185.

Morand, S., Poulin, R., Rohde, K. & Hayward, C. J. 1999. Aggregation and species co-existance of ectoparasites of marine fishes. *International Journal for Parasitology*, **29**: 663-672.

Morand, S., Simková, A., Matejusová, I., Plaisance, L., Verneau, O. & Desdevises, Y. 2002. Investigating patterns may reveal processes: evolutionary ecology of ectoparasitic monogeneans. *International Journal for Parasitology*, **32**: 111-119.

Morrison, D. 2002. How to improve statistical analysis in parasitology research publications. *International Journal for Parasitology*, **32**: 1065-1070.

Nee, S., Gregory, R. D. & May, R. M. 1991. Core or satellite species: Theory and artifacts. *Oikos*, **62**: 279-282.

Nie, P. 1996. Co-occurrence and microhabitat of *Ancyrocephalus mogurndae* (Monogenea) and *Henneguya weishanensis* (Myxosporea) on gills of the mandarin fish, *Siniperca chuatsi*. *Folia Parasitologica*, **43**: 272-276.

Nielsen, C. V. & Buchmann, K. 2001. Occurrence of gyrodactylus parasites in Danish fish farms. *Bulletin of the European Association of Fish Pathologists*, **21**: 19-25.

Ozer, A. 2002. Co-existence of *Dactylogyrus anchoratus* Dujardin, 1845 and *D. extensus* Mueller & Van Cleave, 1932 (Monogenea), parasites of common carp (*Cyprinus carpio*). *Helminthologia*, **39**: 45-50.

Page, R. D. M. 1993. COMPONENT. London: The Natural History Museum.

Page, R. D. M. 1994. Maps between trees and cladistic analysis of historical associations among genes,organisms, and areas. *Systematic Biology*, **43**: 58.

Page, R. D. M. 1995. TREEMAP 1 program, platforms: Microsoft®Windows™, Macintosh®. http://taxonomy.zoology.gla.ac.uk.rod/treemap.html.

Page, R. D. M. 1996. On concensus, confidence, and "total evidence". *Cladistics*, **12**: 83-92.

Page, R. D. M. & Charleston, M. A. 2002. Treemap Versus BPA (Again): A Response To Dowling. pp. 1-26: taxonomy.zoology.gla.ac.uk/publications/tech-reports/.

Paterson, A. M. & Gray, R. D. 1997. Host-parasite co-speciation, host switching and the missing boat. In: *Host-Parasite Evolution: General Principles and Avian Models* (Clayton, D. H. & Moore, J., Eds.) pp. 236-250. Oxford: Oxford University Press.

Pimental, R. A. 1979. Morphometrics: the multivariate analysis of biological data. Kendall/Hunt Publishing Co., Dubuque, IA.

Pimentel, R. A. & Riggins, R. 1987. The nature of cladistic data. *Cladistics*, **3**: 201-03.

Pollard, J. H. 1977. *Numerical and statistical techniques*. Melbourne: Cambridge University Press.

Post, R. J. & Millest, A. L. 1991. Sample size in parasitological and vector surveys. *Parasitology Today*, **7**: 141.

Poulin, R. 1992. Determinants of host-specificity in parasites of freshwater fishes. *International Journal for Parasitology*, **22**: 753-758.

Poulin, R. 1995. Phylogeny, ecology and richness of parasite communities in vertebrates. *Ecological Monographs*, **65**: 283-302.

Poulin, R. 1996. Richness, nestedness and randomness in parasite infracommunity structure. *Oecologia*, **105**: 545-551.

Poulin, R. 1998. *Evolutionary Ecology of Parasites.* New York: Chapman & Hall.

Poulin, R. 2001a. Another look at the richness of helminth communities in tropical freshwater fish. *Journal of Biogeography*, **28**: 737-743.

Poulin, R. 2001b. Interactions between species and the structure of helminth communities. *Parasitology*, **122**: S3-S11.

Poulin, R. & Morand, S. 1999. Geographic distances and the similarity among parasite communities of conspecific host populations. *Parasitology*, **119**: 369-374.

Price, P. W. 1980. *Evolutionary Biology of Parasites.* Princeton, New Jersey.: Princeton University Press.

Pusey, B. J., Bird, J. r., Kennard, M. J. & Arthington, A. H. 1997. Distribution of the Lake Eacham rainbowfish in the Wet Tropics region, North Queensland. *Australian Journal of Zoology*, **45**: 75-84.

Pyecroft, S. B. 1994. Relationship between experimental mycobacteriosis and monogenean infections on gills of the atherinoid fish *Melanotaenia duboulayi*. *Bulletin of the European Association of Fish Pathologists*, **14**: 127-127.

Rae, T. C. 1998. The logical basis for the use of continuous Characters in phylogenetic systematics. *Cladistics*, **14**: 221-28.

Rohde, K. 1979a. A critical evaluation of intrinsic and extrinsic factors responsible for niche restriction in parasites. *American Midland Naturalist*, **114**: 648-671.

Rohde, K. 1979b. A critical evaluation of intrinsic and extrinsic factors responsible for niche restriction in parasites. *American Naturalist*, **114**: 648-671.

Rohde, K. 1993. *Ecology of marine parasites*. Wallingford: CAB International.

Rohde, K., Hayward, C. J. & Heap, M. 1995. Aspects of ecology of metazoan parasites of marine fishes. *International Journal for Parasitology*, **25**: 945-970.

Rohde, K., Roubal, F. R. & Hewitt, G. C. 1980. Ectoparasitic Monogenea, Digenea and Copepoda from the gills of some fishes of New Caledonia and New Zealand. *New Zealand Journal of Marine and Freshwater Research*, **14**: 1-13.

Rohde, K., Worthen, W. B., Heap, M., Hugueny, B. & Guégan, J. F. 1998. Nestedness in assemblages of metazoan ecto- and endoparasites of marine fishes. *International Journal for Parasitology*, **28**: 543-549.

Ronquist, F. 2000. TreeFitter. Computer Program, distributed by the author. University of Uppsala, Uppsala.

Sasal, P. & Morand, S. 1998. Comparative analysis: a tool for studying monogenean ecology and evolution. *International Journal for Parasitology*, **28**: 1637-1644.

Sasal, P., Niquil, N. & Bartoli, P. 1999a. Community structure of digenean parasites of sparid and labrid fishes of the Mediterranean sea: a new approach. *Parasitology*, **119**: 635-648.

Sasal, P., Trouvé, S., Müller-Graf, C. & Morand, S. 1999b. Specificity and host predictability: a comparative analysis among monogenean parasites of fish. *Journal of Animal Ecology*, **68**: 437-444.

Schaffer, M. L. & Samson, F. B. 1985. Population size and extinction: a note on determining critical population size. *American Naturalist*, **125**: 144-152.

Schluter, D. 1984. A variance test for detecting species associations, with some example applications. *Ecology,**65:***

Schmida, G. E. 1997. What's in a name anyway. *Fishes of Sahul*, **11**: 481-500.

Shaw, D. J. & Dobson, A. P. 1995. Patterns of macroparasite abundance and aggregation in wildlife populations: a quantitative review. *Journal of Parasitology*, **111**: S111-S113.

Shinn, A. P., Kay, J. W. & Sommerville, C. 2000. The use of statistical classifiers for the discrimination of species of the genus *Gyrodactylus* (Monogenea) parasitising salmonids. *Parasitology*, **120**: 261-269.

Siddall, M. E. 1996. Phylogenetic covariance probability - confidence and historical associations. *Systematic Biology*, **45**: 48-66.

Siddall, M. E. & Perkins, S. 2003. Brooks Parsimony Analysis: a valiant failure. *Cladistics*, **19**: 554-564.

Simberloff, D. & Moore, J. 1997. *Community ecology of parasites and free-living animals*. Oxford: Oxford University Press.

Simková, A., Desdevises, Y., Gelnar, M. & Morand, S. 2000. Co-existence of nine gill gill ectoparasites (*Dactylogyrus*: Monogenea) parasitising the roach (*Rutilis rutilis* L.): history and present ecology. *International Journal for Parasitology*, **30**: 1077-1088.

Simková, A., Desdevises, Y., Gelnar, M. & Morand, S. 2001a. Morphometric correlates of host specificity in *Dactylogyrus* species (Monogenea) parasites of European Cyprinid fish. *Parasitology*, **123**: 169-177.

Simková, A., Gelnar, M. & Sasal, P. 2001b. Aggregation of congeneric parasites (Monogenea : *Dactylogyrus*) among gill microhabitats within one host species (*Rutilus rutilus* L.). *Parasitology*, **123**: 599-607.

Simková, A., Sasal, P., Kadlec, D. & Gelnar, M. 2001c. Water temperature influencing dactylogyrid species communities in roach, *Rutilus rutilus*, in the Czech Republic. *Journal of Helminthology*, **75**: 373-383.

Sneath, P. H. A. & Sokal, R. R. 1973. *Numerical Taxonomy*. San Francisco: Freeman & Co.

Sokal, R. R. & Rohlf, F. J. 1981. *Biometry. Second edition.* New York: W. H. Freeman & Co.

Sokal, R. R. & Rohlf, F. J. 1995. *Biometry: The Principles and Practice of Statistics in Biological Research*. New York: W. H. Freeman.

Steel, M. A., Hendy, M. D. & Penny, D. 1988. Loss of information in genetic distances. *Nature*, **336**: 118.

Stevens, J. P. 1999. *Intermediate Statistics. A Modern approach.* Mahwah, New Jersey: Lawrence Erlbaum Associates, Publishers.

Suriano, D. M. & Beverley-Burton, M. 1982. *Aethycteron* n. g. (Monogenea: Ancyrocephalinae) from darters (Percidae: Etheostomatini) in Ontario, Canada

with description of *A. caerulei* n. sp., *A. micropercae* n. sp. and *A. nigrae* n. sp. from *Etheostoma* spp. *Canadian Journal of Zoology*, **60**: 1397-1407.

Theile, K. 1993. The Holy Grail of the perfect character: the cladistic treatment of morphometric data. *Cladistics*, **9**: 275-304.

Torgensen, T., Jones, M. R., Stephens, A. W., Searle, D. E. & Ullman, W. J. 1985. Late Quaternary hydrological changes in the Gulf of Carpentaria. *Nature*, **313**: 785-787.

Torgensen, T., Luly, J., De Decker, P., Jones, M. R., Searle, D. E., Chivas, A. R. & Ullman, W. J. 1988. Late Quaternary environments of the Carpentaria Basin, Australia. *Palaeogeography, Palaeoclimatology, Palaeoecology*, **67**: 245-261.

Unmack, P. J. 2001. Biogeography of Australian freshwater fishes. *Journal of Biogeography*, **28**: 1053-1089.

Unmack, P. J. 2002. *http://www.peter.unmack.net/biogeog/clades/rainbows/rain.html*.

Van Every, L. R. & Kritsky, D. C. 1992. Neotropical Monogenoidea. 18. *Anacanthorus* (Mizelle & Price, 1965) (Dactylgyridae: Anacanthorinae) of Piranha (Characoidea: Serrasalmidae) from the central Amazon, their phylogeny, and aspects of host-parasite coevolution. *Journal of the Helminthological Society of Washington*, **59**: 52-75.

Waegele, J. W. 1999. Major sources of errors in phylogenetic systematics. *Zooligischer Anzeiger*, **238**: 329-37.

Wager, R. 1993. The distribution and conservation status of Queensland freshwater fishes. Brisbane: Queensland Department of Primary Industry.

Wager, R. & Jackson, P. 1993. The action plan for Australian freshwater fishes. Canberra: Australian Nature Conservation Agency.

Walther, B. A. & Morand, S. 1998. Comparative performances of species richness estimation methods. *Parasitology*, **116**: 395-405.

Wheeler, T. A. & Beverley-Burton, M. 1989. Systematics of *Onchocleidus* (Mueller, 1936) (Monogenea: Ancyrocephalidae): phylogenetic relationships, evolution, and host associations. *Canadian Journal of Zoology*, **67**: 706-713.

Whittington, I. D. 1998. Diversity "down under": monogeneans in the Antipodes (Australia) with a prediction of monogenean biodiversity worldwide. *International Journal for Parasitology*, **28**: 1481-1493.

Wiley, E. O. 1988. Parsimony analysis and vicariance biogeography. *Systematic Zoology*, **37**: 271-290.

Williams, H. H. 1964. Some new and little known cestodes from Australian elasmobranchs with a brief discussion on their possible use in problems of host taxonomy. *Parasitology*, **54**: 737-748.

Wright, D. H. 1991. Correlations between distribution and abundance are expected by chance. *Journal of Biogeography*, **18**: 463-466.

Young, P. C. 1968. Ten new species of *Haliotrema* (Monogenoidea: Dactylogyridae) from Australian fishes and a revision of the genus. *Journal of Zoology, London*, **154**: 412-75.

Zhu, D., Degnan, S. & Moritz, C. 1998. Evolutionary distinctiveness and status of the endangered Lake Eacham rainbowfish (*Melanotaenia eachamensis*). *Conservation Biology*, **12**: 80-93.

Zhu, D., Samisen, B. G. M., Hula, A. & Moritz, C. 1994. Sequence evolution and phylogenetic signal in control-region and cytochrome b sequences of rainbow fishes (Melanotaeniidae). *Molecular Biology and Evolution*, **11**: 672-683.

Zietara, M. S., Arndt, A., Geets, A., Hellemans, B. & Volckaert, F. A. M. 2000. The nuclear rDNA region of *Gyrodactylus arcuatus* and *G. branchicus* (Monogenea : Gyrodactylidae). *Journal of Parasitology*, **86**: 1368-1373.

APPENDIX A PARASITE SPECIES DESCRIPTIONS

SYSTEMATICS

MONOGENEA Bychowsky, 1937

DACTYLOGYRIDEA Bychowsky, 1937

DACTYLOGYRIDAE Bychowsky 1933

ANCYROCEPHALINAE Bychowsky, 1937

A 1. **RECURVATUS** gen. nov.

DIAGNOSIS. Body minute (rarely >150µm), divisible into cephalic, trunk, peduncle and haptoral regions. Tegument thin, smooth. Head organs three pairs; cephalic lobes, glands present. Eyes rarely two pairs, commonly one pair, anterior or dorsal to pharynx, when present posterior pair larger than anterior pair, generally compact; granules large, sub spherical. Mouth subterminal, midventral; pharynx muscular; intestine bifurcate, caeca united posterior to gonads; diverticula absent. Vitellaria coextensive with intestine, lateral and posterior to crura. Gonads intercaecal; ovary trianguloid, in middle part of body; testis, single, oval to elliptical, smaller than ovary, overlapping ovary dorsally. Vas deferens originating from anterior end of testis, looping around left intestinal crus, joining copulum base dextrally; seminal vesicle formed by dilation of vas deferens, non-sclerotised; prostatic reservoir single, terminating on right side of copulum base. Copulatory apparatus sclerotised, its shaft originating from anterior end of copulum base, consisting of a counter clockwise ring circling copulum base (ventral view, see Kritsky *et al.*, 1985); copulum base bulbate; accessory piece present; spiral filament absent (Type 1 copulatory apparatus Fig. 4.3A see main text). Vagina sclerotised or not, aperture sclerotised, sinistroventral; seminal receptacle, median, formed by dilation at distal end of vagina, anterior to ovary.

Egg with polar filament. Haptor well set off from body, wider than body, subhexagonal. Anchors two pairs, opposed dorsoventrally (Fig. 4.2A see main text), well-developed inner, outer roots, dorsal pair smaller than ventral pair; shaft, blade present; point well-developed; wing processes present. Transverse bars two, not articulated; ventral bar arcuate with two knobs directed anteriorly third of length from end; dorsal bar arcuate, often transversely elongate with lateral extensions. Hooks 14, six pairs (H2-H7) marginal, one pair (H1) more central, five pairs ventral (H1-5), two pairs dorsal (H6-7), hook H4 longer than anchors; hook shaft and handle equally prominent, handle with expanded demarcation; hook H7 anterior to dorsal anchors. Parasites of freshwater atheriniform fishes.

TYPE-SPECIES AND HOST. *Recurvatus chelatus* sp. nov. from *Craterocephalus stercusmuscarum stercusmuscarum* (Günther, 1876), Ross River, Queensland (19°18’ S 146° 45’ E)

OTHER SPECIES. *R. signiferi* sp. nov. from *Pseudomugil signifer* Kner, 1865.

ETYMOLOGY. Named after the Latin term that refers to the copulum shaft shape.

A 2. **RECURVATUS CHELATUS** sp. nov.
(Fig. A1-A2, Appendix B1)

MATERIAL. HOLOTYPE. QM G219478 and PARATYPES. QM G219479-82. All from *Craterocephalus stercusmuscarum stercusmuscarum,* Ross River, Queensland, (19°18’ S 146° 45’ E).

ETYMOLOGY. Named after the Latin name for crab claw, which refers to the shape of the copulatory apparatus accessory piece.

DESCRIPTION. Eyes two pairs, anterior or dorsal to pharynx, anterior eyes usually comprising a few dispersed granules. Anchors with well-developed recurved points.

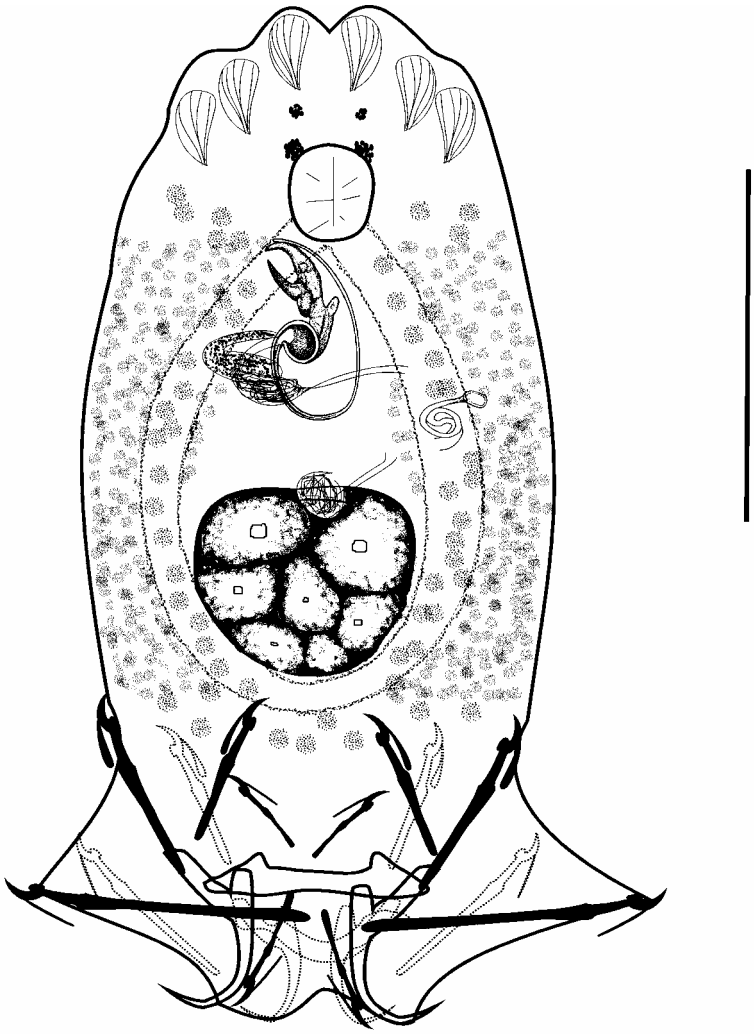
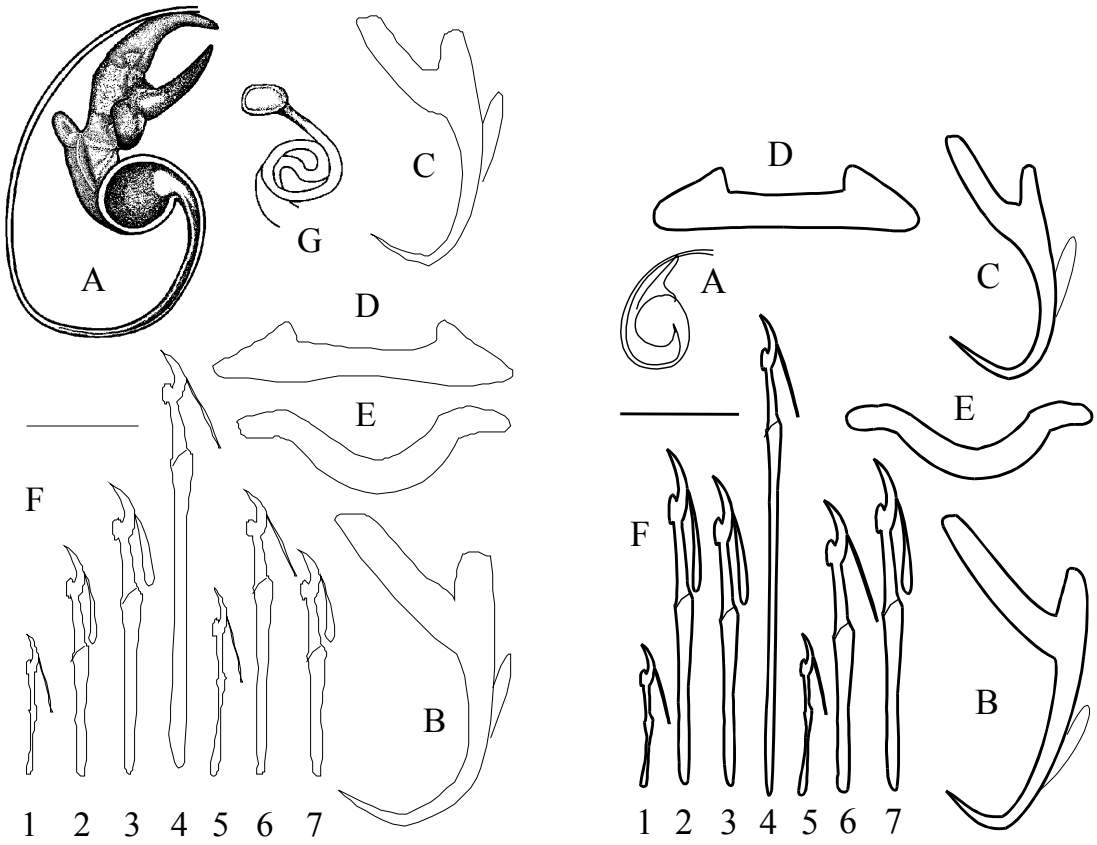


FIG. A1. *Recurvatus chelatus* sp. nov.; Composite drawing whole worm, ventral; Scale-bar: 50 μm.

Ventral bar inverted V. Dorsal bar slightly smaller than ventral, in form of deep inverted arch, lateral extensions present. Hooks increase in length from H1 to H4, H2 and H7 of similar size, H3 and H6 of similar size, all similar thickness. Copulatory apparatus well developed; copulum shaft thin; accessory piece large, well sclerotised, chelate. Vagina sclerotised along entire length, consisting of double coil.

REMARKS. This species is easily distinguished from *R. signiferi* sp. nov. by the presence of an enlarged chelate-shaped accessory piece and a coiled sclerotised vagina.



R. chelatus ***R. signiferi***

FIG. A2. *Recurvatus chelatus* sp. nov. and *R. signiferi* sp. nov.; A, Copulum (dorsal); B, Ventral anchor; C, Dorsal anchor; D, Ventral bar; E, Dorsal bar; F, Hooks 1-7; Scale-bar; G. Vagina: 10 *µm*.

A 3. **RECURVATUS SIGNIFERI** sp. nov.
(Fig. A2, Appendix B1)

MATERIAL. HOLOTYPE QM G218862 and PARATYPES QM G218863-6. All from *Pseudomugil signifer,* Liverpool Creek, Queensland, (17º43' S 145º56' E).

ETYMOLOGY. Named after the type host.

DESCRIPTION. Eyes two pairs, anterior or dorsal to pharynx. Copulatory apparatus reduced, shaft thin; accessory piece reduced, lightly sclerotised, thumb shaped, partially

encapsulating distal end of copulum shaft. Vagina nonsclerotised, tapered, straight. Anchors with well-developed recurved points dorsal anchor slightly smaller than ventral. Ventral bar inverted V. Dorsal bar slightly smaller than ventral bar, consisting of a deep inverted arch with lateral extensions. Hooks H2 and H7 of similar size, H3 smaller than H2, H4 handle much thinner than other hooks, H6 smaller than H3.

A 4. **HELICIRRUS** gen. nov.

DIAGNOSIS. Body minute (rarely >150μm), divisible into cephalic, trunk, peduncle, haptoral regions. Tegument thin, smooth. Head organs three pairs; cephalic lobes, glands present. Eyes one pair or two, anterior or dorsal to pharynx, anterior eyes smaller. Mouth subterminal, midventral; pharynx muscular; intestine bifurcate, united posterior to gonads. Gonads intercaecal; ovary ovoid to elliptical, in posterior part of body; testis, single, oval to elliptical, smaller than ovary, overlapping ovary dorsally. Vas deferens originating from anterior end of testis, looping left intestinal crus; seminal vesicle formed by expansion of vas deferens. Copulatory apparatus consisting of a bulbate copulum base; shaft emanating from anterior end of base and recurved sinistroposteriorly, highly coiled at posterior end with coils posterior to copulum base just anterior to gonads; accessory piece thin elongated spike, attached to right side of base; hair-like filament originating at anterior extremity of shaft (Type II copulatory apparatus, Fig. 4.3B see main text). Single prostatic reservoir present, often partially sclerotised. Vagina not observed; seminal receptacle present, anterior to ovary. Haptor well set off from body, round to hexagonal, equal to body width. Anchors two pairs, one pair dorsal, one pair ventral, opposed dorsoventrally

(elongated hook haptor form (Fig. 4.2A see main text) or dorsal anchor posterior to ventral anchors (reduced hook

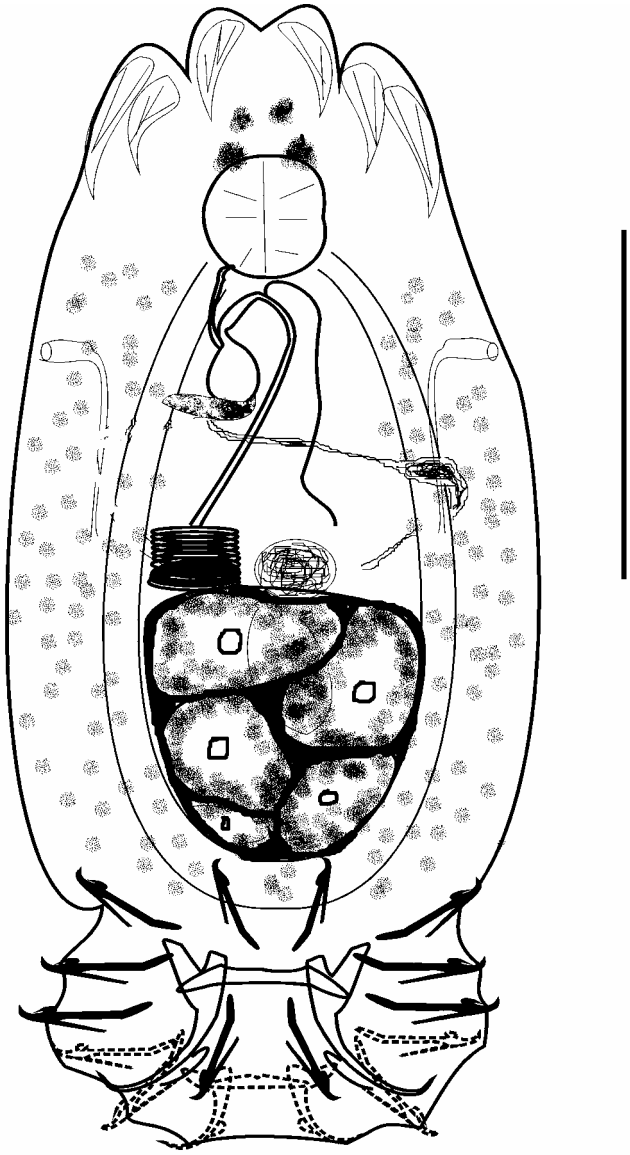


FIG. A3. *Helicirrus splendidae* sp. nov.; Composite drawing whole worm, ventral; Scale-bar: 50 *µm*.

haptor form (Fig. 4.2B see main text); ventral anchors larger than dorsal; inner, outer roots distinct; shaft, blade present; wing processes inconspicuous. Two transverse bars present, not articulated; ventral bar straight, transversely elongate, often much larger than dorsal, with two processes third of length from ends along anterior edge, directed anteriorly.

Dorsal bar arched, well-developed or highly reduced. Hooks 14, six pairs marginal (H2-H7), pair one more central, five pairs (H1-5) ventral, two pairs dorsal (H6-7); reduced form with kink present third of length from end of handle, H7 posterior to ventral anchors, H4 shorter than ventral anchor; elongated form with H4 longer than ventral anchor, H7 anterior to ventral anchors; hook shaft and handle equally prominent, with prominent expanded demarcation; wing processes present. Parasites on gills of freshwater atheriniform fishes.

TYPE SPECIES. *H. splendidae* sp. nov. from *Melanotaenia splendida splendida,* Ross River, Queensland, (19° 18' S 146° 45' E).

OTHER SPECIES. *H. gertrudaea* sp. nov. from *P. gertrudae* weber, 1911, *H. megaloanchor* sp. nov. from *M. s. splendida* (Peters, 1866), *H. mcivori* sp. nov. from *M. trifasciata* (Rendahl, 1922), *H. maccullochii* sp. nov. from *M. maccullochi* Ogilby, 1915, *H. marjoriaea* sp. nov. from *C. marjoriae.*

ETYMOLOGY. Named after the Latin term meaning coiled hair, which refers to the distal end of copulum shaft.

A 5. **HELICIRRUS SPLENDIDAE** sp. nov.
(Fig. A3-A4, Appendix B2)

MATERIAL. HOLOTYPE QM G218850 and PARATYPES QM G218851-4. All from *Melanotaenia splendida splendida,* Ross River, Queensland, (19°18' S 146° 45' E).

ETYMOLOGY. Named after the type host.

DESCRIPTION. Eyes two pairs, anterior eyes slightly smaller. Haptor with reduced hook orientation (Fig. 4.2B see main text). Dorsal anchors smaller than ventral, with well-developed inner, reduced outer root; point poorly developed. Ventral anchors with well-

developed inner root, reduced outer root; recurved point poorly developed. Dorsal bar much smaller than ventral, inverted arch, thin, weakly developed. Hooks of reduced form and similar size. Copulum shaft with approximately ten coils at posterior end; copulum base single chamber, bulbate, slightly elongate. Accessory piece slightly curved. Seminal vesicle formed by kidney shaped expansion of vas deferens midway between copulum base and loop of intestine. Two excretory pores with cup shaped cavity at body margin, opening at level of copulatory apparatus, ducts extending posteriorly along margin of intestine.

REMARKS. This species is similar to *H. maccullochi* sp. nov. by having reduced hooks, dorsal anchors and bar. They differ in the shape of the copulum shaft and ventral anchor inner root length.

A 6. **HELICIRRUS MEGALOANCHOR** sp. nov.
(Fig. A4, Appendix B2)

MATERIAL. HOLOTYPE QM G219458 and PARATYPES QM G219459-62. All from *Melanotaenia splendida splendida,* Ross River, Queensland, (19°18’ S 146° 45’ E).

ETYMOLOGY. Named after the large size of the ventral anchors.

DESCRIPTION. Eyes two pairs. Haptor with reduced hook sclerite orientation (Fig. 4.2B see main text). Ventral anchors much larger than dorsal, well-developed inner, reduced outer root; recurved point well-developed. Dorsal anchors with weakly developed inner, outer root, inner root directed toward point; point reduced or absent, often inconspicuous. Dorsal bar slight inverted arch, thin, highly reduced, often inconspicuous, smaller than ventral. Hooks of reduced form and similar size.

Copulum shaft expanded proximally posterior to shaft recurve loop, approximately 15 coils at posterior end. Accessory piece thin, directed anteriorly, slightly curved tip. Prostatic reservoir partially sclerotised.

REMARKS. This species is similar to *H. splendidae* sp. nov. and *H. maccullochii* sp. nov. by having reduced hooks, dorsal bar and dorsal anchors. They differ in the size of the ventral anchors.

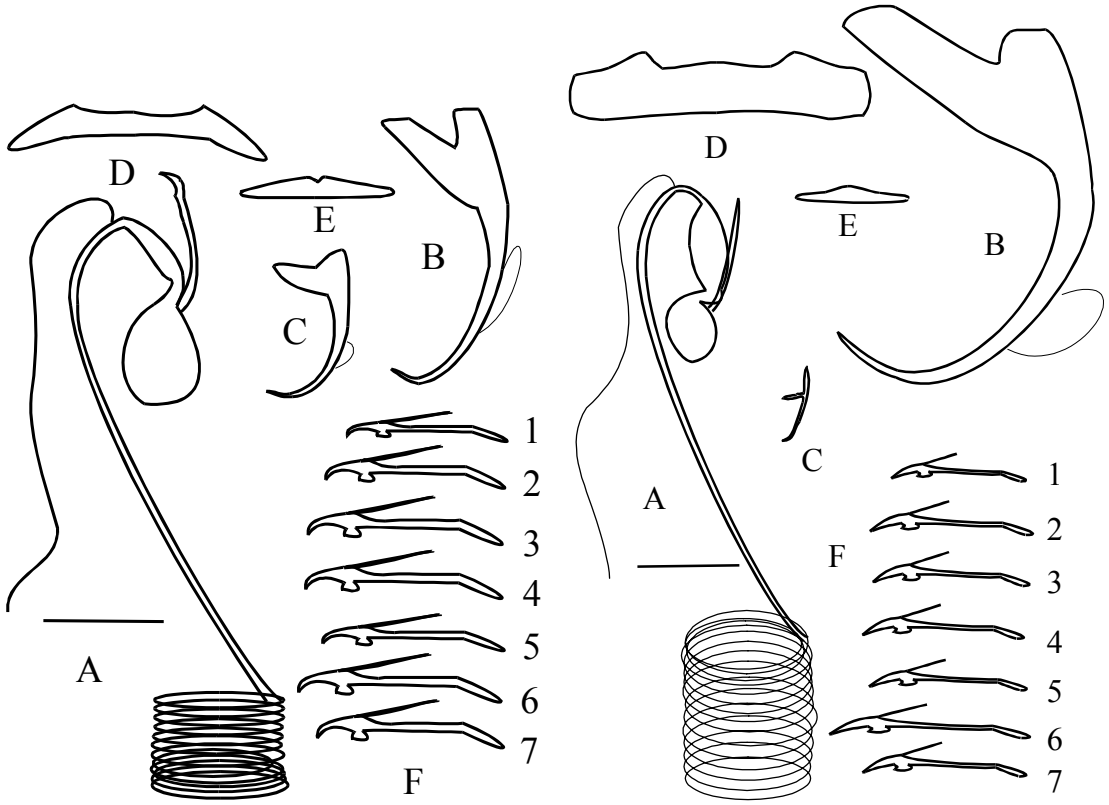


FIG. A4. *Helicirrus splendidae* sp. nov. and *H. megaloanchor*; A, Copulum (dorsal); B, Ventral anchor; C, Dorsal anchor; D, Ventral bar; E, Dorsal bar; F, Hooks 1-7; Scale-bar: 10 μm.

A 7. **HELICIRRUS MACCULLOCHII** sp. nov.
(Fig. A5, Appendix B2)

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MATERIAL. HOLOTYPE QM G218823 and PARATYPES QM G218824-7. All from *Melanotaenia maccullochi,* McIvor River, Queensland, (15° 03' S 145° 26' E).

ETYMOLOGY. Named after the type host.

DESCRIPTION. Eyes one pair. Haptor with reduced hook sclerite orientation (Fig. 4.2B see main text). Ventral anchors much larger than dorsal, well-developed inner, outer roots; recurved point well-developed. Dorsal bar weakly-developed inverted arch, much

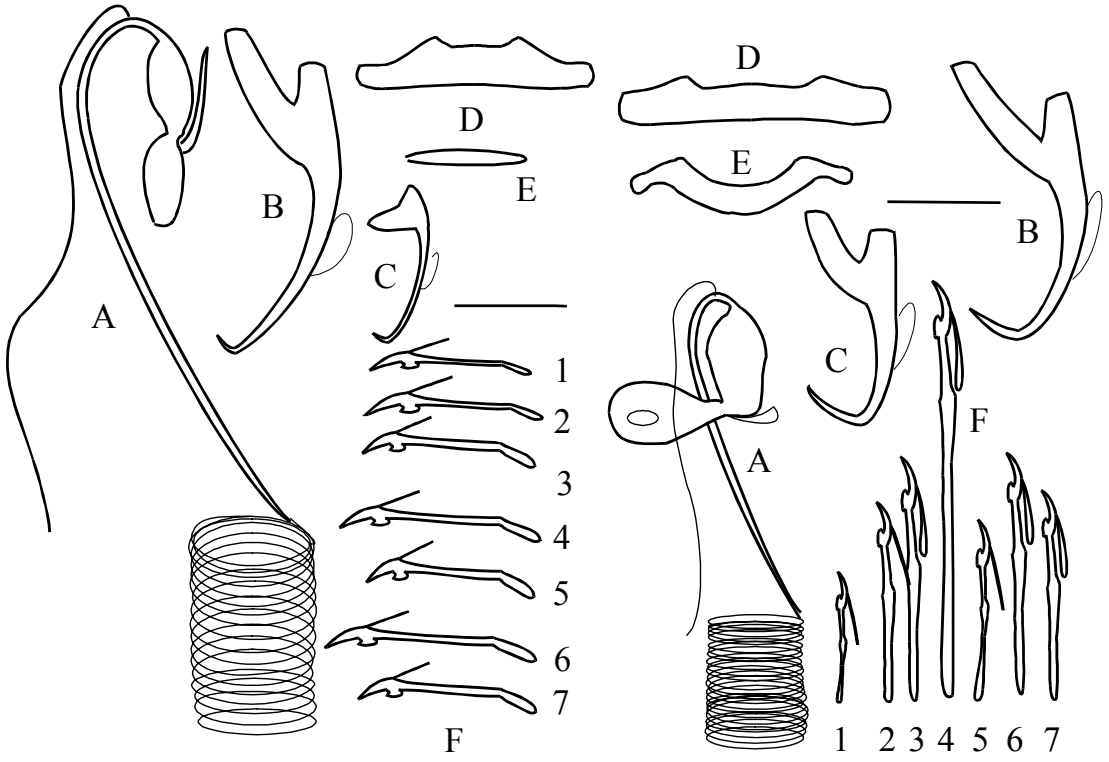


FIG. A5. *Helicirrus maccullochii* sp. nov. and *Helicirrus mcivori* sp. nov.; A, Copulum (dorsal); B, Ventral anchor; C, Dorsal anchor; D, Ventral bar; E, Dorsal bar; F, Hooks 1-7; Scale-bar: 10 *µm*.

smaller than ventral. Hooks of reduced form and similar size. Copulum shaft expanded proximally posterior to shaft recurve loop, approximately 35 coils at posterior end; accessory piece thin spike. Prostatic reservoir partially sclerotised.

REMARKS. See remarks for *H. megaloanchor* sp. nov. and *H. splendidae* sp. nov.

A 8. **HELICIRRUS MCIVORI** sp. nov.
(Fig. A5, Appendix B2)

MATERIAL. HOLOTYPE QM G219486 and PARATYPES QM G219487-9. All from *Melanotaenia trifasciata,* McIvor River, Queensland, (15° 09' S 145° 26' E).

ETYMOLOGY. Named after the type host location.

DESCRIPTION. Eyes one pair. Haptor with elongated hook sclerite orientation (Fig. 4.2A see main text). Ventral anchors slightly larger than dorsal, well-developed inner, outer roots; recurved point well-developed. Dorsal bar well-developed inverted arch, similar in size to ventral. Hooks elongated form, increasing in handle length from H1 to H4, H4 much longer than other hooks and ventral anchors, H3 and H6 of similar length, H7 anterior to ventral anchors. Copulum base orientated perpendicular and sinistral to shaft; shaft expanded proximal to recurve, approximately 30 coils at posterior end; accessory piece reduced. Seminal vesicle expanded bulb at loop of gut crura.

REMARKS. This species is similar to *H. gertrudaea* sp. nov. and *H. marjoriae* sp. nov. by having elongated hooks and well-developed dorsal anchors and bar. It differs by having a proximal expansion of the copulum shaft.

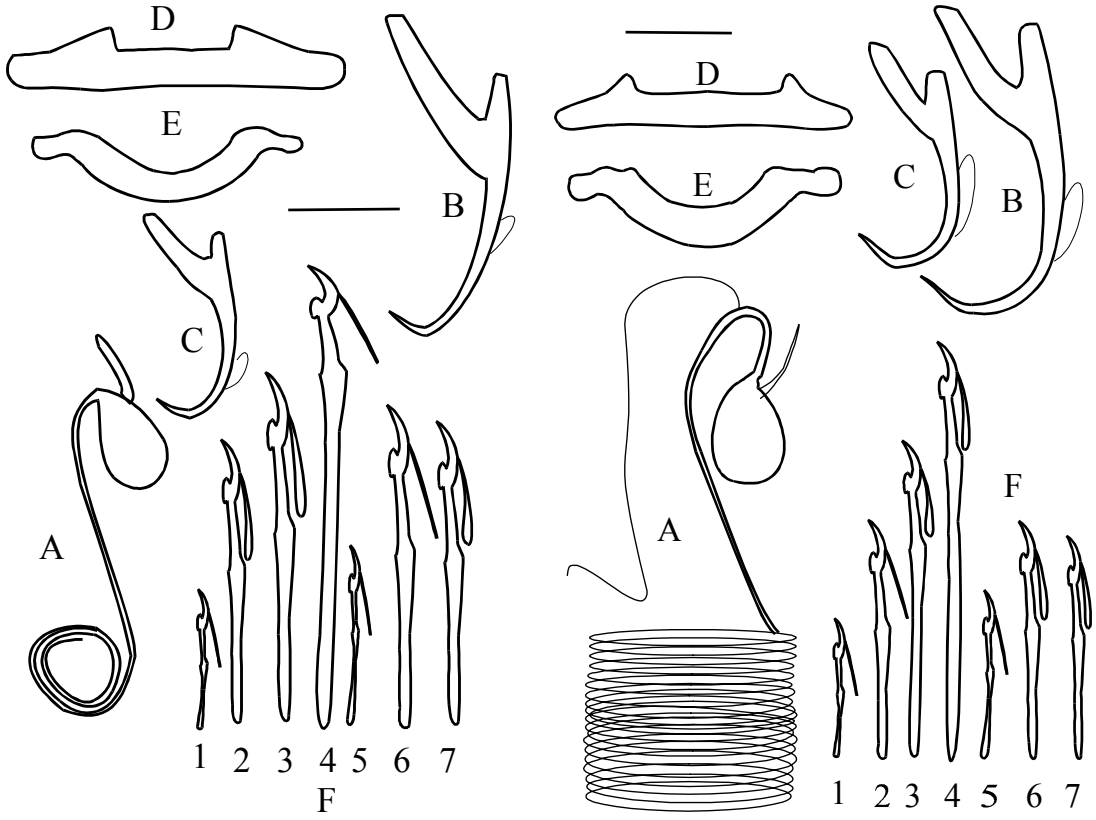
A 9. **HELICIRRUS GERTRUDAEA** sp. nov.
(Fig. A6, Appendix B2)

MATERIAL. HOLOTYPE QM G218857 and PARATYPES QM G218858-61. All from *Pseudomugil gertrudaea,* Howard Creek, Northern Territory, (12° 27’ S 130° 50’ E).

ETYMOLOGY. Named after the type host.

DESCRIPTION. Eyes two pairs, anterior eyes reduced. Haptor with elongated hook sclerite orientation (Fig. 4.2A see main text). Ventral anchors larger than dorsal, well-developed inner, outer roots; recurved point. Dorsal bar well-developed inverted arch, similar in size to ventral. Hooks elongated form, increasing in handle length from H1 to H4 then decrease in length, H4 longer than ventral anchor, H3 longer than H6, H7 longer than H2. Copulum shaft thin, proximal expansion absent, approximately ten coils at posterior end; copulum base single chamber, oval, elongated; accessory piece elongated spike.

REMARKS. This species is most similar to *H. marjoriaea* sp. nov. by having elongated hooks and well-developed anchors and bars. They differ in the number of coils present in the copulum shaft.



Helicirrus gertrudaea ***Helicirrus marjoriaea***

FIG. A6. *Helicirrus gertrudaea* sp. nov. and *H. marjoriaea* sp. nov.; A, Copulum (dorsal); B, Ventral anchor; C, Dorsal anchor; D, Ventral bar; E, Dorsal bar; F, Hooks 1-7; Scale-bar: 10 *µm*.

A 10. **HELICIRRUS MARJORIAEA** sp. nov.
(Fig. A6, Appendix B2)

MATERIAL. HOLOTYPES QM G218834 and PARATYPES QM G218835-8. All from *Craterocephalus marjoriae,* Amamoor Creek, Queensland, (26º 21’ S 152°40’ E).

ETYMOLOGY. Named after the type host.

DESCRIPTION. Eyes one pair. Haptor with elongated hook sclerite orientation (Fig. 4.2A main text). Ventral anchor slightly larger than dorsal, well-developed inner, outer roots; recurved point well-developed. Dorsal bar well-developed inverted arch, similar in size to ventral. Hooks elongated form, hook H7 slightly smaller than H2, H3 much longer than H6, H4 longer than anchors. Copulum shaft thin, proximal

expansion absent, approximately 30 coils at posterior end; accessory piece elongated spike. Prostatic reservoir partially sclerotised.

REMARKS. See remarks for *H. gertrudaea* sp. nov.

A 11. **LONGIDIGITIS** gen. nov.

DIAGNOSIS. Dactylogyridae. Body minute (rarely >150*μm*), divisible into cephalic, trunk, peduncle and haptoral region. Tegument thin, smooth. Head organs three pairs, cephalic lobes and glands present. Eyes rarely two pairs, commonly one, anterior or dorsal to pharynx, anterior eyes, when present, consisting of scattered granules. Mouth subterminal, midventral; pharynx muscular; intestine bifurcate, united posterior to gonads. Vitellaria coextensive with intestine, lateral and posterior to crura. Gonads intercaecal; ovary trianguloid, in middle part of body; testis single, oval to elliptical, smaller than ovary, overlapping ovary dorsally. Vas deferens originating from anterior end of testis, looping intestinal crus sinistrally, joining dextral side of copulum base posteriorly; seminal vesicle formed by dilation of vas deferens, often partially sclerotised; single prostatic reservoir originating from dextral side of copulum base. Copulatory apparatus consisting of a copulum base; copulum shaft originating from anterior end of copulum base consisting of a single sinistral recurved loop (Type III copulatory apparatus, Fig. 4.3C see main text) distal end arches anterior to copulum base and is directed at right side of body, terminating dextral to copulum base; base bulbate; accessory piece thumb shaped, directed anteriorly; spiral filament absent. Vagina, non-sclerotised, opening sinistromarginal; seminal receptacle formed by dilation of vagina at distal end, anterior to ovary.

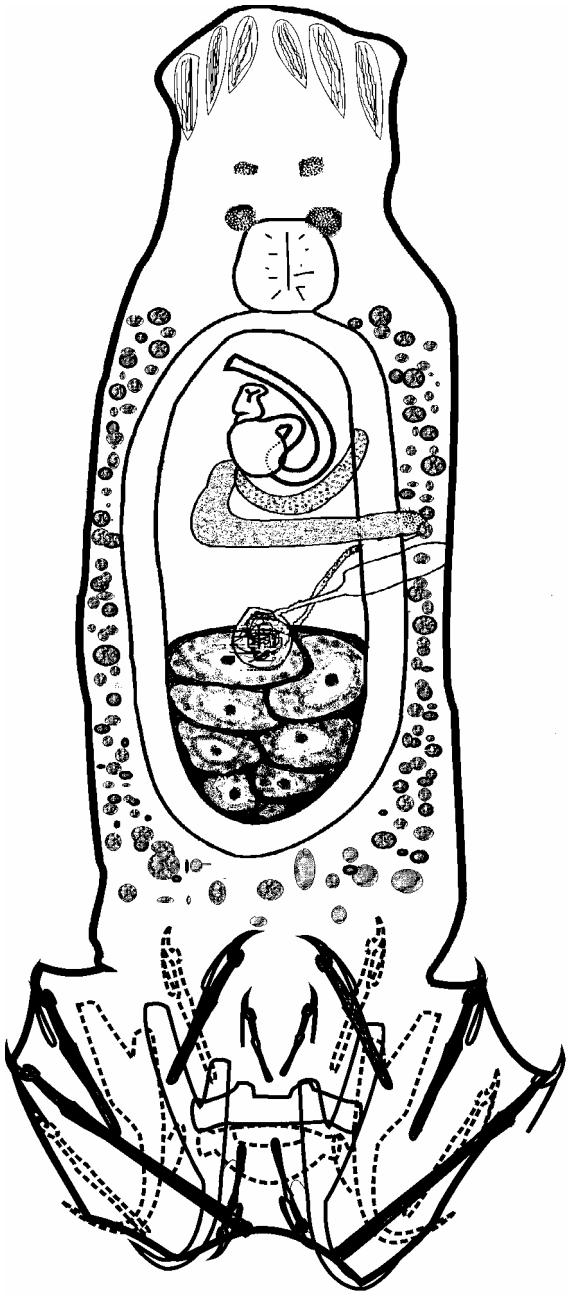


FIG. A7. *Longidigitis auripontiformis* sp. nov.; composite drawing whole worm ventral; Scale-bar: 50 *µm*.

Egg with polar filament. Haptor well-set off from body, wider than body,

subhexagonal in shape. Anchors two pairs, well-developed, opposed dorsoventrally

(Fig. 4.2A see main text); dorsal anchors smaller than ventral, inner roots well-

developed, outer roots reduced; shaft and blade present; point well developed; ventral anchors inner, outer roots; shaft and blade present; point well-developed. Transverse bars two, not articulated; ventral bar with two knobs directed anteriorly third of length from end, usually tapering laterally, rarely with expansions at ends; dorsal bar arcuate, often transversely elongate with lateral extensions, medial notch present or absent on posterior surface, equal in length or slightly smaller than ventral. Hooks 14, six pairs (H2-H7) marginal, pair one more central, five pairs ventral (H1-H5), two pairs dorsal (H6-7); handle length increasesfrom H1 to H4, H4 always longer than the anchors, H7 anterior to ventral anchors; hook shaft and handle equally prominent, handle with expanded demarcation; wing process present. Parasites of freshwater fish (Atheriniformes).

TYPE SPECIES AND HOST. *Longidigitis auripontiformis* sp. nov. from *M. s. splendida*, Bluewater Creek, Queensland, (19°18’ S 146° 45’ E).

OTHER SPECIES: *Longidigitis iliocirrus* sp. nov. and *L. robustus* sp. nov. from *M. s. splendida, L. maccullochii* sp. nov. from *M. maccullochi, L. hopevalensis* sp. nov. from *M. trifasciata, L. gracilis* sp. nov. from *Melanotaenia utcheensis* McGuigan, 2001 and *M. eachamensis*, *L. utcheei* sp. nov. from *Cairnsichthys rhombosomoides* (Nichols and Raven, 1928).

ETYMOLOGY. Named after the Latin term meaning long fingers, which refers to the hooks.

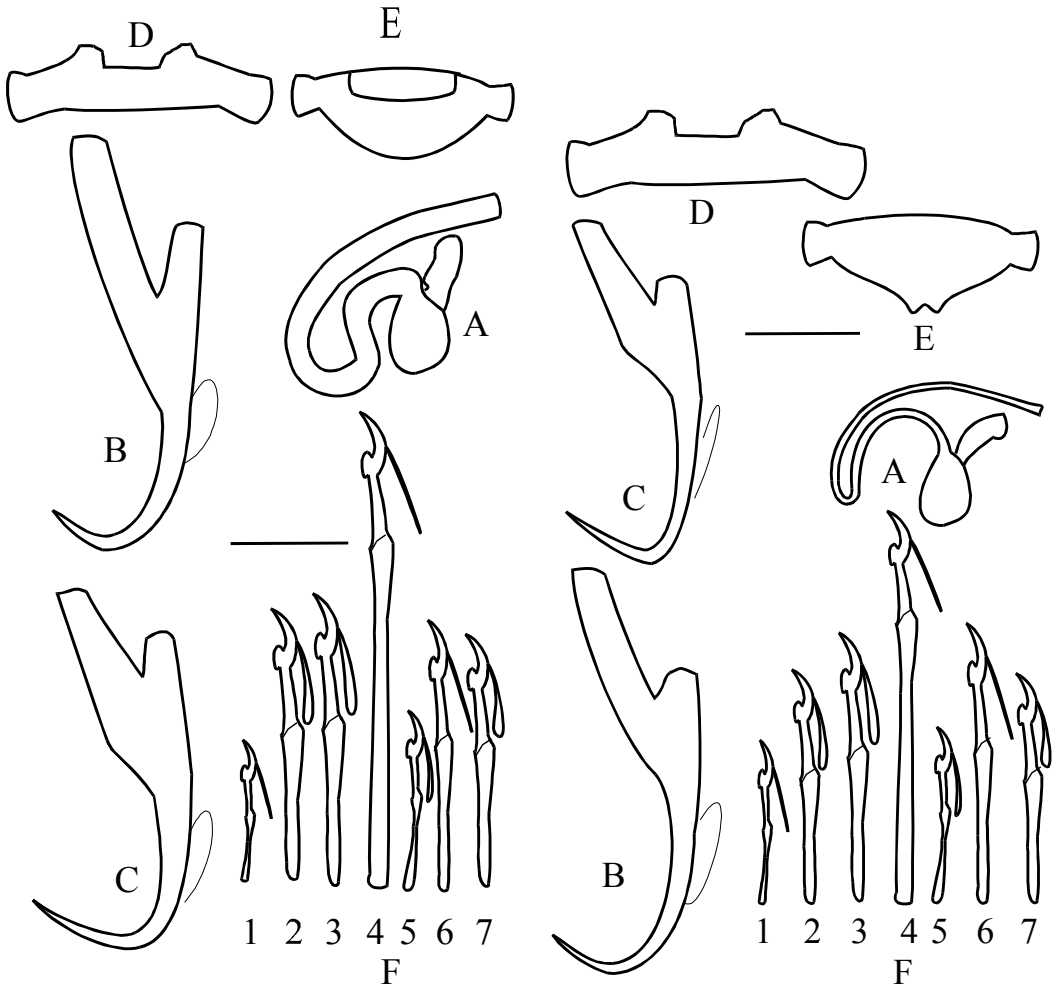
A 12. **LONGIDIGITIS AURIPONTIFORMIS** sp. nov.
(Fig. A7-A8, Appendix B3)

MATERIAL. HOLOTYPE QM G218877 and PARATYPES QM G218878-81. All from *Melanotaenia splendida splendida,* Bluewater Creek, Queensland, (19°18’ S, 146° 45’ E).

ETYMOLOGY. Named after the Latin term meaning ear-shaped bridge, which refers to the dorsal bar shape.

DESCRIPTION. Eyes two pairs, rarely one. Dorsal anchors slightly smaller than ventral, with well-developed elongated points, inner roots, slightly reduced outer roots with conspicuous bump on inner curve of shaft; ventral anchor well-developed inner, outer roots. Ventral bar arcuate, not tapering laterally, ends square with protuberance directed anteriorly. Dorsal bar, semi-circular, with lateral extensions, notch absent on posterior edge, thin membranous infill present on anterior edge. Hooks H7 smaller than H2, H6 smaller than H3, H1 and H5 much smaller than H6. Copulum shaft thick; accessory piece well-developed. Vas deferens with partially sclerotised seminal vesicle, extending from copulum to intestinal crus loop. Vagina tubular, usually inconspicuous.

REMARKS. This species is similar to *L. hopevalensis* sp. nov. by having similar shaped anchors and ventral bar. It is distinguished by the thickness of the copulum shaft and the shape of the ventral bar.



Longidigitis auripontiformis ***Longidigitis hopevalensis***

FIG.A8. *Longidigitis auripontiformis* sp. nov and *L. hopevalensis* sp. nov.; A, Copulum (dorsal); B, Ventral anchor; C, Dorsal anchor; D, Ventral bar; E, Dorsal bar; F, Hooks 1-7; Scale-bar: 10 *µm*.

A 13. **LONGIDIGITIS HOPEVALENSIS** sp. nov.
(Fig. A8, Appendix B3)

MATERIAL. HOLOTYPE QM G219490 and PARATYPES QM G219491-3. All from *Melanotaenia trifasciata,* McIvor River, Queensland, (15° 09’ S 145° 26’ E).

ETYMOLOGY. Named after the town Hopevale near the sample location.

DESCRIPTION. Eyes two pairs, rarely one. Dorsal anchors slightly smaller than ventral, with well-developed elongated points, inner roots, reduced outer roots with conspicuous

bump on inner curve of shaft. Ventral anchor well-developed inner roots, reduced outer roots. Ventral bar arcuate, not tapering laterally, ends square with protuberance directed anteriorly. Dorsal bar, semi-circular, with lateral extensions, posteromedial notch present, thick infill present on anterior edge. Hooks H7 smaller than H2, H6 smaller than H3, H1 and H5 much smaller than H6. Copulum shaft thin; accessory piece well-developed. Vas deferens with partially sclerotised seminal vesicle, extending from copulum to intestinal crus loop. Vagina tubular, usually inconspicuous.

REMARKS. See *L. auripontiformis* sp. nov. for remarks.

A 14. **LONGIDIGITIS ROBUSTUS** sp. nov.
(Fig. A9, Appendix B3)

MATERIAL HOLOTYPE QM G218882 and PARATYPES QM G219195. All from *Melanotaenia splendida splendida,* Bluewater Creek, Queensland, (19°18’ S, 146° 45’ E).

ETYMOLOGY. Named after the robust anchors.

DESCRIPTION. Eyes one pair, rarely two. Dorsal anchors slightly smaller than ventral, with well-developed elongated points, well-developed thickened inner, outer roots, outer roots slightly reduced in length. Ventral bar arcuate, ends square with protuberance directed anteriorly. Dorsal bar expanded medially, tapering laterally, posteromedial notch present, thick membranous infill present on anterior edge. Hooks H7 and H2 of equal length, H6 smaller than H3, H2 slightly smaller than H6. Copulum shaft thin, with highly reduced loop; accessory piece well-developed. Vas deferens inconspicuous. Vagina inconspicuous.

REMARKS. This species can be distinguished from other members of the genus by the robust anchors and shape of the bars.

A 15. **LONGIDIGITIS MACCULLOCHII** sp. nov.
(Fig. A9, Appendix B3)

MATERIAL. HOLOTYPE QM G218828 and PARATYPES QM218829-33. All from *Melanotaenia maccullochi,* McIvor River, Queensland, (15° 03' S 145° 26' E).

ETYMOLOGY. Named after the type host.

DESCRIPTION. Eyes two pairs. Dorsal anchors slightly smaller than ventral, both with well-developed recurved points, inner, outer roots. Ventral bar triangular, with lateral extremities tapered. Dorsal bar of similar size to ventral, consisting of an inverted arch, transversely elongate with lateral extensions; thin membranous infill absent on anterior edge; posteromedial notch absent. Hooks H2 and H7 similar length, H6 smaller than H3, H1 and H5 much smaller than H6. Copulum shaft thin; accessory piece lightly sclerotised, anterior end directed away from inner edge of copulum shaft.

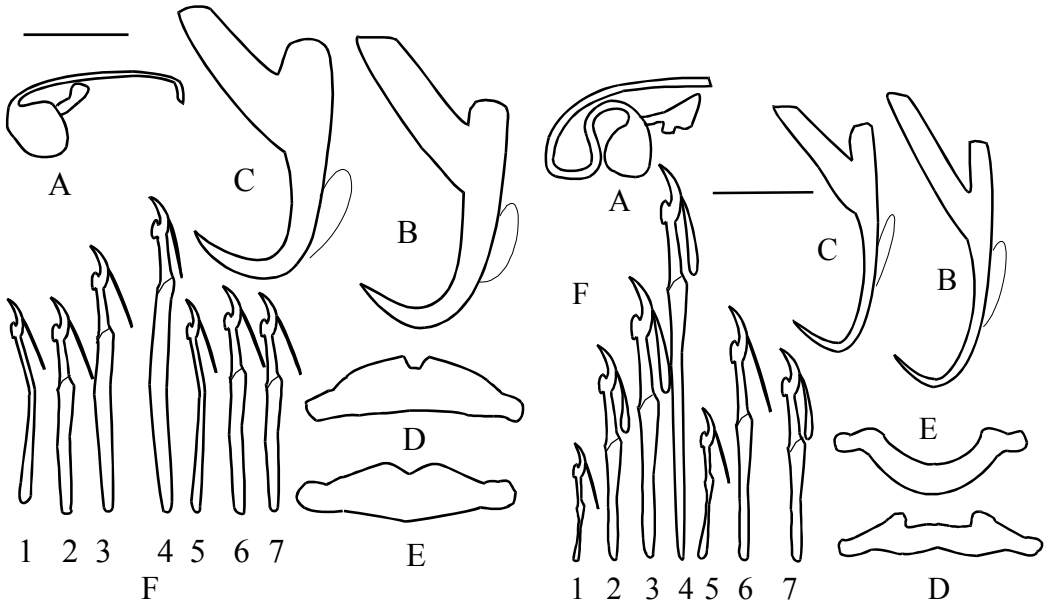


FIG. A9. *Longidigitis robustus* sp. nov. and *Longidigitis maccullochii* sp. nov.; A. Copulum (dorsal); B, Ventral anchor; C, Dorsal anchor; D, Ventral bar; E, Dorsal bar; F, Hooks 1-7; Scale-bar: 10 μm.

Vas deferens not sclerotised; seminal vesicle partially sclerotised, formed by bulbate dilation of vas deferens just posterior to copulum base. Vagina elongate tube.

REMARKS. This species is most similar to *L. utcheei* sp. nov. It differs in the size of the copulum shaft and shape of the bar structures.

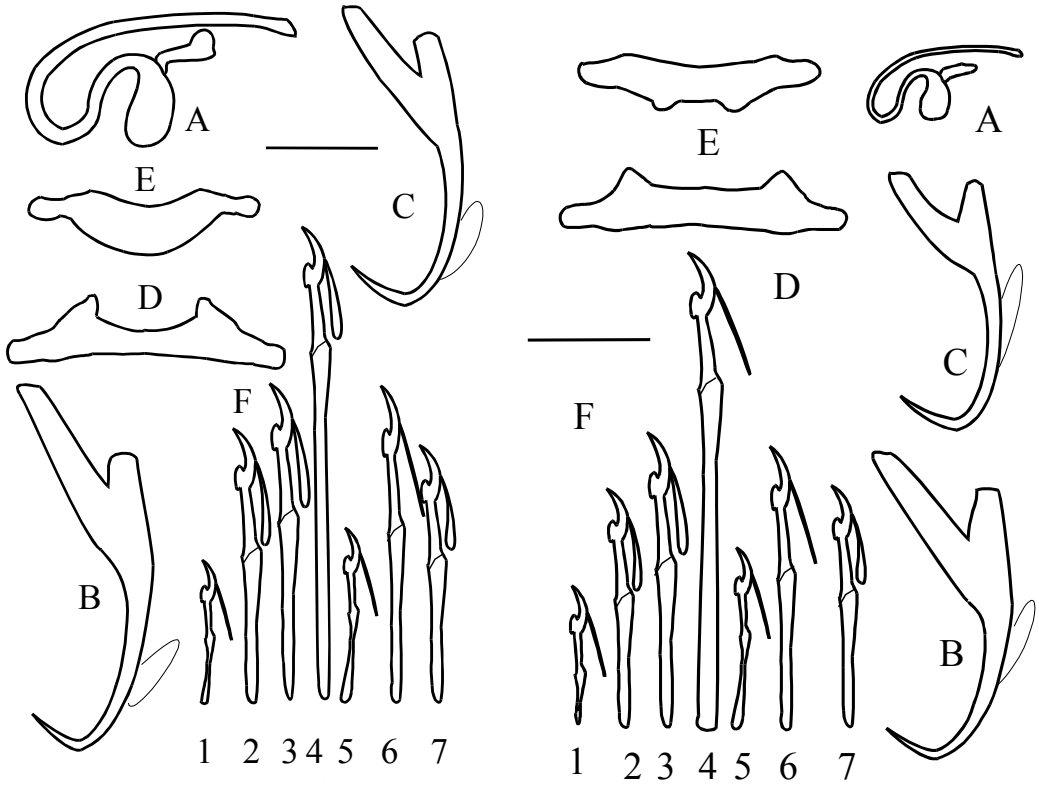
A 16. **LONGIDIGITIS UTCHEEI** sp. nov.
(Fig. A10, Appendix B3)

MATERIAL. HOLOTYPE QM G219473 and PARATYPES QM G219474-7. All from *Cairnsichthys rhombosomoides,* Utchee Creek, Queensland, (17º37 S 145º56 E).

ETYMOLOGY. Named after the type-host collection site.

DESCRIPTION. Eyes two pairs, anterior or dorsal to pharynx. Anchors with well-developed recurved points and inner and outer roots; dorsal anchors slightly smaller than ventral. Ventral bar inverted V, tapering laterally. Dorsal bar slightly smaller than ventral; consisting of a shallow inverted arch, with lateral extensions, thin membranous infill reduced on anterior edge, posteromedial notch absent. Hooks H2 and H7 similar length, H3 and H6 of similar length, H1 and H5 much smaller than H6. Copulum shaft thick; accessory piece slightly sclerotised. Seminal vesicle non-sclerotised. Vagina inconspicuous.

REMARKS. See remarks for *L. maccullochii* sp. nov.



Longidigitis utcheei ***Longidigitis gracilis***

FIG. A10. *Longidigitis utcheei* sp. nov. and *Longidigitis gracilis* sp. nov; A, Copulum (dorsal); B, Ventral anchor; C, Dorsal anchor; D, Ventral bar; E. Dorsal bar; F, Hooks 1-7; Scale-bar: 10 *µm*.

A 17. **LONGIDIGITIS GRACILIS** sp. nov.

(Fig. A10, Appendix B3)

MATERIAL. HOLOTYPE QM 218845 and PARATYPES QM G218846-9. All from *Melanotaenia utcheensis,* Utchee Creek, Queensland, (17º37 S 145º56 E).

ETYMOLOGY. Named after the thin copulum shaft.

DESCRIPTION. Eyes two pairs. Dorsal and ventral anchors with well-developed recurved points, inner, outer roots. Dorsal anchors slightly smaller than ventral. Dorsal bar slightly smaller than ventral, consisting of a shallow inverted arch with lateral extensions, thin membranous infill absent on anterior edge, posteromedial notch present. Ventral bar straight, tapering laterally. Hooks H2 and H7 of similar

length, H3 and H6 of similar length, H1 and H5 much smaller than H6. Copulum shaft thin; accessory piece thin partially sclerotised. Seminal vesicle non-sclerotised. Vagina tubular, usually inconspicuous.

REMARKS. This species is similar to *L. maccullochii* sp. nov. and *L. utcheei* sp. nov. It differs by having a posteromedial notch on the dorsal bar and the size of the copulum shaft.

A 18. **ILIOCIRRUS** gen. nov.

DIAGNOSIS. Dactylogyridae. Body minute (rarely >150*μm*), divisible into cephalic, trunk, peduncle, haptoral regions. Tegument thin, smooth. Head organs three pairs; cephalic lobes and glands present. Mouth subterminal, midventral; pharynx muscular; intestine bifurcate, united posterior to gonads. Eyes rarely two pairs, commonly one, anterior or dorsal to pharynx, anterior eyes, when present, consisting of scattered granules. Gonads intercaecal; ovary trianguloid, in middle part of body; testis single, oval to elliptical, smaller than ovary, overlapping ovary dorsally. Vas deferens originating from anterior end of testis, looping intestinal crus sinistrally, joining copulum base posterodextrally; seminal vesicle non-sclerotised, formed by dilation of vas deferens; prostatic reservoir, single terminating dextral to copulum base. Copulum sclerotised, shaft originating from anterior end of copulum base, consisting of a double sinistral recurved loop (Type IV copulatory apparatus, Fig. 4.3D see main text), distal end arches anterior to copulum base, directed to dextral side of body, terminating dextral to copulum base; base bulbate; accessory piece thumb shaped, directed anteriorly; spiral filament absent. Vagina, non-sclerotised,

opening dextromarginal; seminal receptacle formed by dilation of vagina, at distal end, anterior to ovary. Vitellaria coextensive with intestine, lateral and posterior to crura. Haptor well set off from body, wider than body, sub-hexagonal. Anchors two pairs, well-developed, opposed dorsoventrally (Fig. 4.2A see main text); dorsal anchors much smaller than ventral. Transverse bars two, not articulated; ventral bar laterally elongate, two knobs directed anteriorly third of length from end, usually tapering laterally, rarely with expansions at ends; dorsal bar arcuate, with lateral extensions, medial notch present on posterior surface, smaller than ventral. Hooks 14, six pairs (H2-H7) marginal, pair one more central, five pairs ventral, two pairs dorsal (H6-7), H7 anterior to ventral anchors; handle length increases from H1 to H4, H4 always longer than the anchors; hook shaft and handle equally prominent, handle with expanded demarcation; wing process present. Parasites of freshwater atherinform fishes.

TYPE SPECIES AND HOST. *I. iliocirrus* sp. nov. from *M. s. splendida,* Bluewater Creek, Queensland, (19°18’ S 146° 45’ E).

OTHER SPECIES: *Iliocirrus trifasciatae* sp. nov. from *M. trifasciata, I. mazlini* sp. nov. from *M. eachamensis* and *Melanotaenia utcheensis*, *I. ornatusi* sp. nov. from *Rhadinocentrus ornatus* Regan, 1914, *I. rossi* sp. nov. from *C. s. stercusmuscarum.*

ETYMOLOGY. Named after the Latin term meaning twisted-hair, which refers to the form of the copulum shaft.

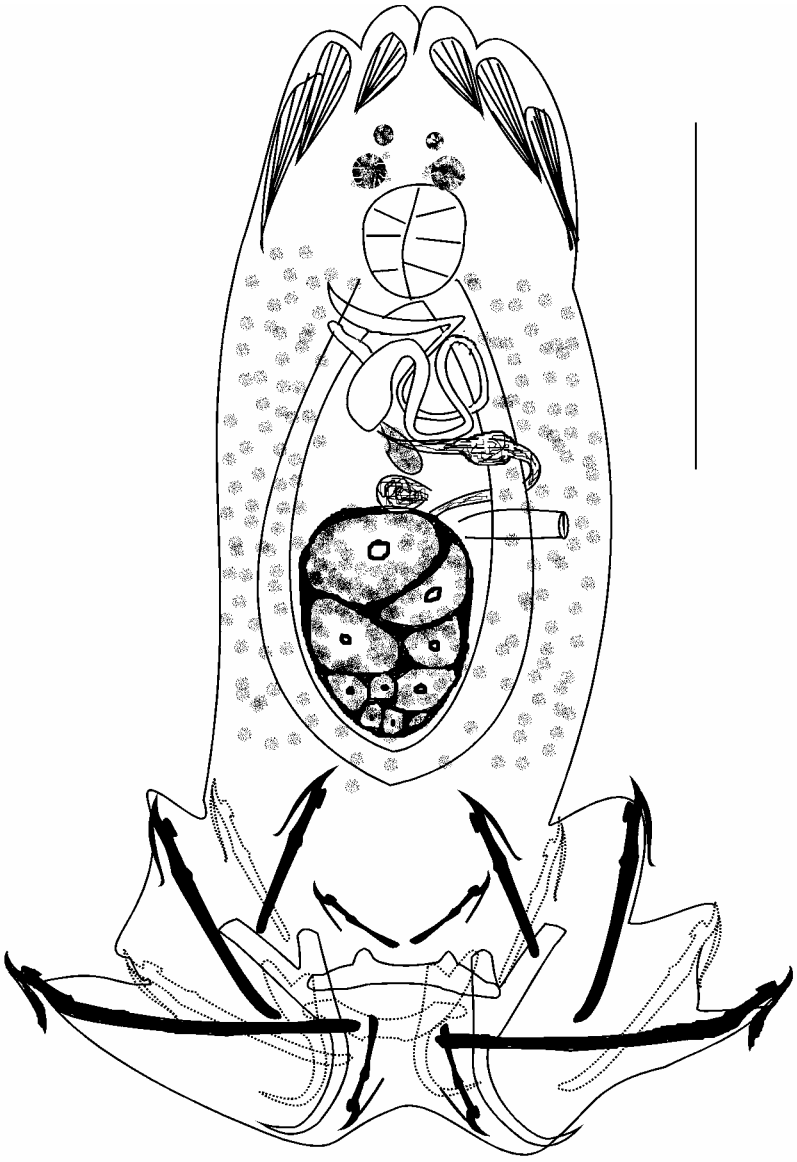


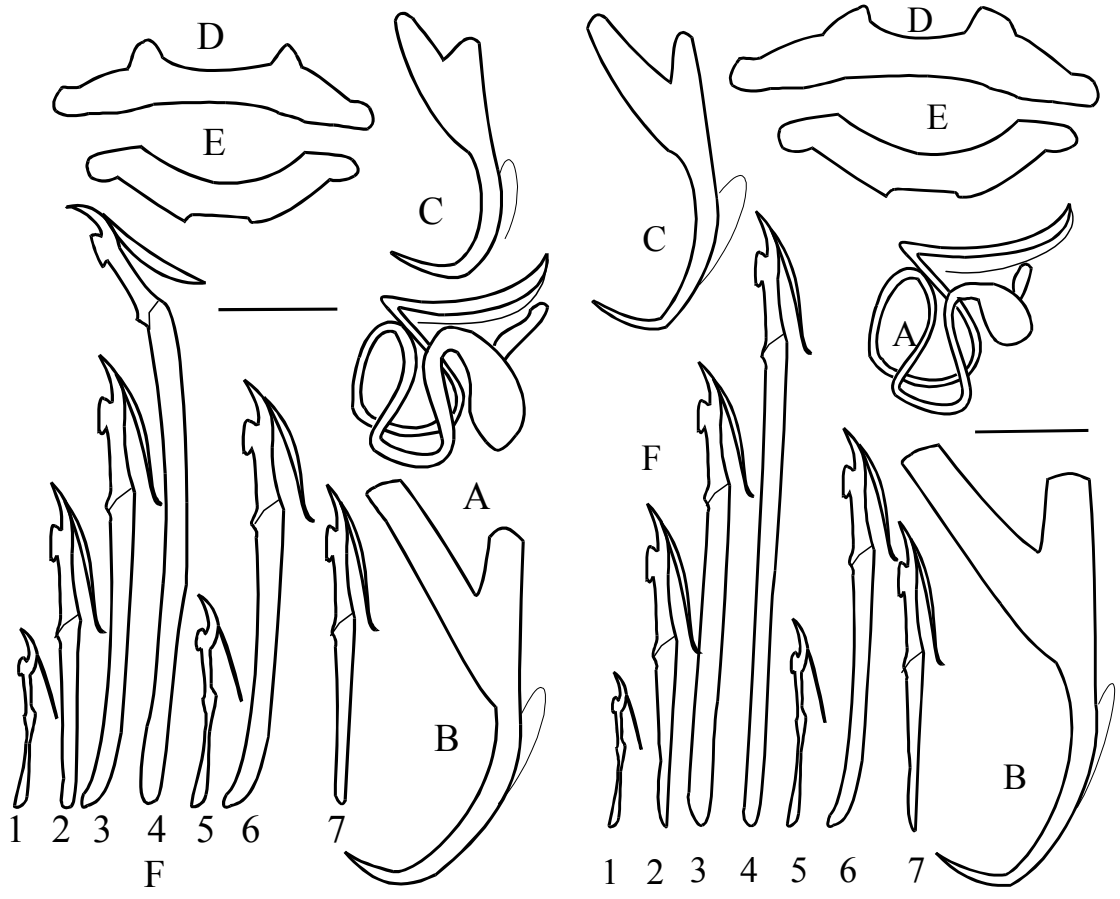
FIG. A11. *Iliocirrus iliocirrus* sp. nov.; Composite drawing whole worm, ventral; Scale-bar: 50 *µm*.

A 19. **ILIOCIRRUS ILIOCIRRUS** sp. nov.
(Fig. 11-12, Appendix B4)

MATERIAL. HOLOTYPE QM G219468 and PARATYPES QM G219469-72. All from *Melanotaenia splendida splendida,* Bluewater Creek, Queensland, (19°18’ S 146° 45’ E).

ETYMOLOGY. Named after the Latin term for twisted hair, which refers to the shape of the copulum shaft.

DESCRIPTION. Eyes one pair, rarely two. Vas deferens, non-sclerotised; seminal vesicle consisting of expanded bulb at point of loop around intestine. Copulum shaft consisting of a thick well-developed double sinistral recurved loop, distal end with pronounced sickle-shape expansion; accessory piece thin lightly sclerotised. Vagina tubular. Anchors with well-developed recurved points, shaft, blade present; ventral anchor with well-developed inner, outer roots; dorsal anchors much smaller than ventral, with reduced inner, outer roots.



Iliocirrus iliocirrus ***Iliocirrus rossi***

FIG. A12. *Iliocirrus iliocirrus* sp. nov. and *Iliocirrus rossi* sp. nov.; A, Copulum (dorsal); B, Ventral anchor; C, Dorsal anchor; D, Ventral bar; E, Dorsal bar; F, Hooks 1-7; Scale-bar: 10 *μm*.

Dorsal bar shallow inverted arch; ventral bar ends tapering laterally. Hooks H7 slightly smaller than H2, H6 slightly smaller than H3, H1 and H5 much smaller than H6.

REMARKS. This species is most similar to *I. rossi*. sp. nov. It is easily distinguished by morphometric differences and the copulum shaft thickness.

A 20. **ILIOCIRRUS ROSSI** sp. nov.
(Fig. A12. Appendix B4)

MATERIAL. HOLOTYPE QM G219463 and PARATYPES QM G219464-7. All from *Craterocephalus stercusmuscarum stercusmuscarum,* Ross River, Queensland, (19°18' S 146° 45' E).

ETYMOLOGY. Named after the type host locality.

DESCRIPTION. Eyes one pair, rarely two. Anchors with well-developed recurved points, shaft, blade present; ventral anchors with well developed inner, outer roots; dorsal anchors much smaller than ventral, reduced inner roots, outer roots. Ventral bar with ends tapering laterally; dorsal bar inverted bell curve, with lateral extensions at extremities, slightly smaller than ventral. Hooks H7 slightly smaller than H7, H6 much smaller than H3, H1 and H5 much smaller than H6. Copulum shaft consisting of a thin well-developed double sinistral recurved loop, distal end with sickle-shape expansion; accessory piece thin, lightly sclerotised. Vas deferens, non-sclerotised; seminal vesicle consisting of expanded bulb at point of loop around intestine. Vagina tubular. This species is not visually discernable from *I. iliocirrus*. Morphometric variation used as criteria for species recognition.

REMARKS. See *L. iliocirrus* sp. nov. and morphometric analysis.

A 21. **ILIOCIRRUS TRIFASCIATAE** sp. nov.
(Fig. A13, Appendix B4)

MATERIAL. HOLOTYPE QM G218872 and PARATYPES QM G218873-6. All from *Melanotaenia trifasciata,* McIvor River, Queensland, (15° 09' S 145° 26' E).

ETYMOLOGY. Named after the type host.

DESCRIPTION. Eyes two pairs, anterior eyes usually a few dispersed granules. Anchors shaft, blade present; point well-developed; dorsal anchors much smaller than ventral; with reduced inner, outer roots. Ventral bar with ends tapering laterally; dorsal bar slightly smaller than ventral, consisting of a deep inverted arch with lateral extensions. Hooks H2 slightly longer than H7, H3 and H6 of similar length, H1 and H5 much smaller than H6. Copulum shaft thin, with loop reduced; accessory piece reduced, lightly sclerotised. Seminal vesicle non-sclerotised. Vagina tubular, usually inconspicuous.

REMARKS. This species is most similar to *I. iliocirrus* sp. nov. and *I. rossi* sp. nov. in the size and shape of the haptoral sclerites. It differs from these species by the shape of the copulum shaft.

A 22. **ILIOCIRRUS ORNATUSI** sp. nov.
(Fig. A13, Appendix B4)

MATERIAL. HOLOTYPE QM G218867 and PARATYPES QM G218868-71. All from *Rhadinocentrus ornatus,* Brunswick River, New South Wales, (28º70' S 151º50 E).

ETYMOLOGY. Named after the type host.

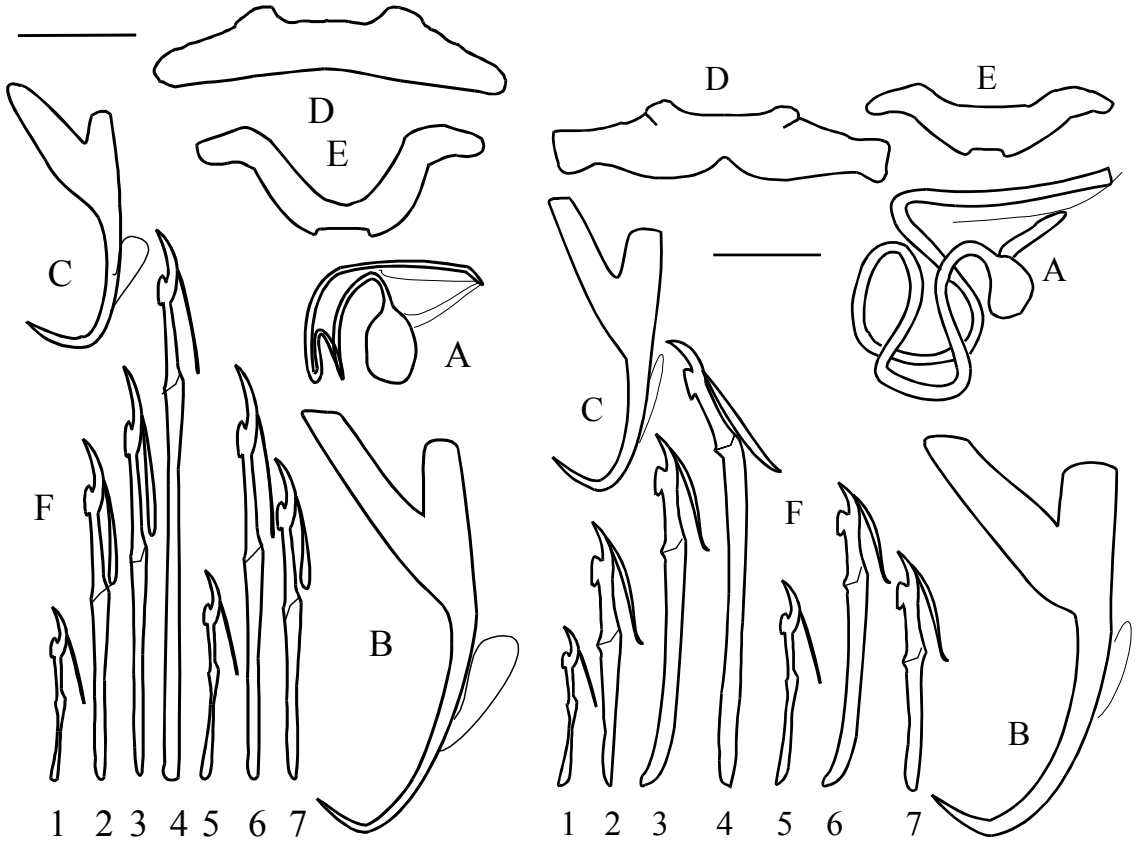


FIG. A13. *Iliocirrus trifasciatae* sp. nov. and *Iliocirrus ornatusi* sp. nov.; A, Copulum (dorsal); B, Ventral anchor; C, Dorsal anchor; D, Ventral bar; E. Dorsal bar; F, Hooks 1-7; Scale-bar: 10 *μm*.

DESCRIPTION. Eyes two pairs, anterior or dorsal to pharynx. Anchors shaft, blade present; point well-developed; ventral anchors with well-developed inner, outer roots; dorsal anchors much smaller than ventral, highly reduced inner, outer roots. Ventral bar with ends expanded and square, v-shaped notch present on posteromedial edge; dorsal bar slightly smaller than ventral, deep inverted arch. Hooks H7 smaller than H2, H6 smaller than H3, H1 and H5 much smaller than H6. Copulum shaft thin, distal end straight tube; accessory piece reduced, lightly sclerotised. Seminal vesicle inconspicuous. Vagina tubular, usually inconspicuous.

REMARKS. This species is most similar to *I. mazlini* having similar hook length ratios. It differs in the shape of the ventral bar and ventral anchor.

A 23. **ILIOCIRRUS MAZLINI** sp. nov.
(Fig. A14, Appendix B4)

MATERIAL. Holotype QM G218839 and Paratypes QM G218840-4. All from *Melanotaenia eachamensis,* Dirran Creek, Queensland, (17º27 S 145º06 E).

ETYMOLOGY. Named after Rob Mazlin who helped me with collections and kept me inspired.

DESCRIPTION. Eyes two pairs. Anchors shaft, blade present; point well-developed; ventral anchors with well-developed inner, outer roots, distinct bump present on outer curve of blade; dorsal anchors much smaller than ventral, highly reduced inner, outer roots. Ventral bar inverted V, tapering laterally; dorsal bar slightly smaller than ventral, deep inverted arch. Hooks H7 much smaller than H2, H6 smaller than H3, H1 and H5 much smaller than H6. Copulum shaft thin; base elongate; accessory piece elongate, thin, partially sclerotised. Seminal vesicle inconspicuous. Vagina tubular.

REMARKS. See *I. ornatusi* sp. nov. for remarks.

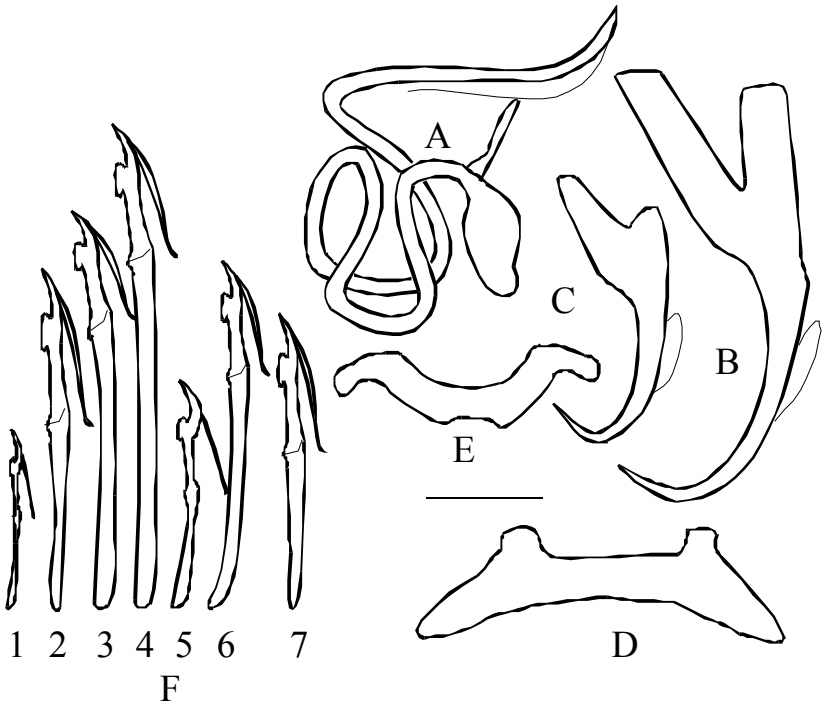


FIG. A14. *Iliocirrus mazlini* sp. nov.; A, Copulum (dorsal); B, Ventral anchor; C, Dorsal anchor; D, Ventral bar; E, Dorsal bar; F, Hooks 1-7; Scale-bar: 10 *μm*.

APPENDIX B CHAPTER 4 TABLES

TABLE B1. Morphometric measurements (*µm*) for species of *Recurvatus*.
Means and standard error. ME, number of parasites measured; BL, body length; BW, body width; HW, haptor width; HL, haptor length; PD, pharynx diameter; DA1-6, dorsal anchor; VA1-6, ventral anchor; DB1-3, dorsal bar; VA1-2, ventral bar; H1-7, hook length. ( ) range.

	R. chelatus	*R. signiferi*
ME	28	40
BL	(100-155)	(100-150)
BW	(45-80)	(50-70)
HL	(25-50)	(30-50)
HW	(60-85)	(55-90)
PD	(9-11)	(10-12)
DA1	6.6 ± 0.14	6.8 ± 0.12
DA2	22.9 ± 0.29	22.4 ± 0.24
DA3	17.4 ± 0.24	15.1 ± 0.20
DA4	21.3 ± 0.27	18.6 ± 0.23
DA5	7.7 ± 0.21	8.4 ± 0.18
DA6	10.8 ± 0.22	9.6 ± 0.18
VA1	5.7 ± 0.14	5.0 ± 0.12
VA2	27.5 ± 0.33	27.4 ± 0.28
VA3	20.2 ± 0.26	19.2 ± 0.22
VA4	24.9 ± 0.34	23.4 ± 0.28
VA5	11.6 ± 0.28	12.5 ± 0.23
VA6	13.7 ± 0.26	13.4 ± 0.21
DB1	24.2 ± 0.31	22.4 ± 0.26
DB2	0	0
DB3	7.8 ± 0.15	6.3 ± 0.13
VB1	27.4 ± 0.32	23.9 ± 0.27
VB2	13.2 ± 0.20	12.1 ± 0.17
H1	12.4 ± 0.20	13.5 ± 0.17
H2	20.2 ± 0.30	30.2 ± 0.25
H3	25.0 ± 0.40	27.5 ± 0.34
H4	36.7 ± 0.42	43.6 ± 0.35
H5	16.6 ± 0.22	15.2 ± 0.18
H6	24.0 ± 0.35	25.9 ± 0.29
H7	19.7 ± 0.32	29.0 ± 0.17

TABLE B2. Morphometric measurements (*µm*) for species of *Helicirrus*.
Means and standard error. ME, number of parasites measured; BL, body length; BW, body width; HW, haptor width; HL, haptor length; PD, pharynx diameter; DA1-6, dorsal anchor; VA1-6, ventral anchor; DB1-3, dorsal bar; VA1-2, ventral bar; H1-7, hook length. ( ) range.

	H. splendidae	*H. megaloanchor*	*H. maccullochii*	*H. mcivori*	*H. gertrudaea*	*H. marjoriaea*
ME	28	15	10	17	15	41
BL	(140-200)	(130-170)	(130-200)	(90-160)	(80-100)	(100-150)
BW	(70-140)	(40-80)	(50-90)	(25-50)	(25-40	(50-100)
HL	(25-55)	(35-50)	(25-40)	(25-45)	(20-35)	(25-45)
HW	(50-70)	(50-90)	(50-80)	(40-90)	(50-70)	(60-110)
PD	(15-21)	(10-16)	(17-21)	(7-11)	(8-12)	(9-15)
DA1	2.7 ± 0.17	2.4 ± 0.24	1.80 ± 0.29	4.87 ± 0.26	3.7 ± 0.19	6.07 ± 0.10
DA2	11.3 ± 0.31	9.3 ± 0.47	11.20 ± 0.39	19.4 ± 0.38	18.3 ± 0.32	20.80 ± 0.14
DA3	10.9 ± 0.18	4.7 ± 0.17	12.60 ± 0.31	14.8 ± 0.50	14.2 ± 0.20	15.73 ± 0.12
DA4	12.9 ± 0.26	6.7 ± 0.17	14.10 ± 0.28	17.6 ± 0.68	16.6 ± 0.24	19.43 ± 0.14
DA5	4.2 ± 0.21	2.4 ± 0.18	2.50 ± 0.17	5.1 ± 0.19	7.1 ± 0.28	7.15 ± 0.13
DA6	7.1 ± 0.17	1.9 ± 0.11	5.50 ± 0.22	8.4 ± 0.21	8.6 ± 0.35	10.18 ± 0.16
VA1	2.1 ± 0.16	5.6 ± 0.44	2.10 ± 0.10	4.7 ± 0.17	3.9 ± 0.17	5.78 ± 0.10
VA2	21.6 ± 0.26	38.6 ± 0.44	26.00 ± 0.61	25.6 ± 0.45	27.9 ± 0.34	27.38 ± 0.16
VA3	19.2 ± 0.26	32.0 ± 0.47	23.40 ± 0.45	18.1 ± 0.46	20.4 ± 0.29	21.35 ± 0.13
VA4	22.4 ± 0.26	37.7 ± 0.65	27.40 ± 0.40	21.8 ± 0.48	25.0 ± 0.32	26.30 ± 0.19
VA5	5.9 ± 0.25	13.8 ± 0.52	8.30 ± 0.47	9.8 ± 0.44	11.5 ± 0.27	9.72 ± 0.17
VA6	10.9 ± 0.19	25.6 ± 0.47	13.40 ± 0.40	11.4 ± 0.21	11.9 ± 0.31	13.85 ± 0.14
DB1	12.7 ± 0.33	12.7 ± 0.24	10.50 ± 0.37	19.8 ± 0.32	24.3 ± 0.25	25.68 ± 0.24
DB2	0.00	0.00	.00	0.00	0.00	.00
DB3	2.4 ± 0.13	2.6 ± 0.24	2.30 ± 0.15	5.6 ± 0.18	6.1 ± 0.18	7.50 ± 0.13
VB1	21.9 ± 0.25	31.0 ± 0.58	21.80 ± 0.33	24.5 ± 0.31	24.1 ± 0.35	28.38 ± 0.24
VB2	11.0 ± 0.21	15.3 ± 0.29	7.70 ± 0.30	11.8 ± 0.23	10.9 ± 0.25	15.43 ± 0.22
H1	14.1 ± 0.24	13.9 ± 0.39	13.20 ± 0.42	12.2 ± 0.47	12.2 ± 0.17	13.23 ± 0.17
H2	15.7 ± 0.25	16.9 ± 0.39	16.10 ± 0.23	18.5 ± 0.37	24.5 ± 0.19	22.65 ± 0.18
H3	16.4 ± 0.24	17.1 ± 0.51	16.10 ± 0.23	22.5 ± 0.33	30.3 ± 0.32	30.52 ± 0.29
H4	17.0 ± 0.23	16.2 ± 0.43	16.10 ± 0.18	37.8 ± 0.41	39.3 ± 0.35	41.53 ± 0.28
H5	15.6 ± 0.40	16.6 ± 0.34	13.70 ± 0.37	16.2 ± 0.30	15.9 ± 0.24	17.57 ± 0.19
H6	17.8 ± 0.41	21.1 ± 0.31	17.80 ± 0.39	22.1 ± 0.30	27.5 ± 0.34	22.98 ± 0.23
H7	17.2 ± 0.19	17.1 ± 0.31	16.90 ± 0.43	19.5 ± 0.69	26.8 ± 0.38	21.08 ± 0.19

TABLE B3. Morphometric measurements (*µm*) for species of *Longidigitis*. Means and standard error. ME, number of parasites measured; BL, body length; BW, body width; HW, haptor width; HL, haptor length; PD, pharynx diameter; DA1-6, dorsal anchor; VA1-6, ventral anchor; DB1-3, dorsal bar; VA1-2, ventral bar; H1-7, hook length. ( ) range.

	L. auripontiformis	*L. hopevalensis*	*L. robustus*	*L. maccullochii*	*L. utcheei*	*L. gracilis*
ME	35	16	20	47	27	31
BL	(120-160)	(110-140)	(130-220)	(90-160)	(120-190)	(110-140)
BW	(35-60)	(40-70)	(50-90)	(40-70)	(50-80)	(50-70)
HL	(25-50)	(20-40)	(30-50)	(25-60)	(30-50)	(25-40)
HW	(60-95)	(50-70)	(50-80)	(50-80)	(55-80)	(50-80)
PD	(9-12)	(9-12)	(13-17)	(9-13)	(11-15)	(9-11)
DA1	9.4 ± 0.14	7.9 ± 0.18	6.4 ± 0.26	5.52 ± 0.09	6.2 ± 0.21	5.0 ± 0.14
DA2	30.7 ± 0.31	29.4 ± 0.26	26.2 ± 0.26	23.00 ± 0.18	27.0 ± 0.49	20.6 ± 0.24
DA3	23.8 ± 0.21	22.0 ± 0.26	19.2 ± 0.28	17.81 ± 0.17	20.8 ± 0.20	15.8 ± 0.20
DA4	27.2 ± 0.23	24.5 ± 0.26	22.4 ± 0.27	20.27 ± 0.19	23.9 ± 0.28	19.0 ± 0.23
DA5	9.7 ± 0.19	10.8 ± 0.40	10.8 ± 0.31	6.96 ± 0.13	7.4 ± 0.28	6.0 ± 0.20
DA6	13.0 ± 0.25	11.9 ± 0.41	12.4 ± 0.48	8.27 ± 0.14	9.9 ± 0.14	8.8 ± 0.24
VA1	5.4 ± 0.13	6.1 ± 0.17	6.3 ± 0.22	4.62 ± 0.08	5.4 ± 0.13	5.1 ± 0.17
VA2	34.7 ± 0.39	34.2 ± 0.26	27.2 ± 0.31	27.65 ± 0.24	31.7 ± 0.36	23.4 ± 0.26
VA3	22.8 ± 0.24	24.1 ± 0.27	18.7 ± 0.35	18.87 ± 0.19	22.1 ± 0.19	16.6 ± 0.18
VA4	28.5 ± 0.20	27.1 ± 0.34	21.9 ± 0.26	22.85 ± 0.22	26.3 ± 0.28	20.4 ± 0.22
VA5	13.5 ± 0.27	12.7 ± 0.21	11.8 ± 0.36	11.13 ± 0.18	11.4 ± 0.33	8.8 ± 0.23
VA6	12.6 ± 0.24	13.1 ± 0.30	13.1 ± 0.30	9.94 ± 0.24	10.9 ± 0.18	10.0 ± 0.23
DB1	19.2 ± 0.27	19.4 ± 0.27	20.7 ± 0.36	17.79 ± 0.15	20.7 ± 0.29	19.3 ± 0.32
DB2	0.00	0.0	0.00	.00	0.00	4.4 ± 0.16
DB3	7.8 ± 0.18	8.6 ± 0.15	5.9 ± 0.19	5.33 ± 0.10	5.4 ± 0.14	5.6 ± 0.20
VB1	22.7 ± 0.25	25.7 ± 0.34	20.4 ± 0.20	19.54 ±0.16	25.0 ± 0.29	23.1 ± 0.31
VB2	8.6 ± 0.15	9.6 ± 0.12	5.2 ± 0.66	8.02 ± 0.13	9.4 ± 0.18	11.2 ± 0.24
H1	13.2 ± 0.17	14.1 ± 0.26	12.4 ± 0.44	11.96 ± 0.13	12.4 ± 0.26	11.0 ± 0.21
H2	22.9 ± 0.27	21.0 ± 0.20	19.2 ± 0.35	20.83 ± 0.20	24.0 ± 0.41	18.8 ± 0.25
H3	24.4 ± 0.24	22.8 ± 0.28	24.0 ± 0.37	26.65 ± 0.27	27.5 ± 0.46	22.7 ± 0.31
H4	41.0 ± 0.32	33.3 ± 0.33	28.8 ± 0.42	36.94 ± 0.27	40.7 ± 0.64	36.7 ± 0.31
H5	16.4 ± 0.21	16.1 ± 0.20	15.9 ± 0.36	14.08 ± 0.12	15.2 ± 0.16	14.3 ± 0.35
H6	23.6 ± 0.24	24.2 ± 0.28	23.6 ± 0.49	24.10 ± 0.20	28.8 ± 0.46	21.6 ± 0.24
H7	22.1 ± 0.26	20.2 ± 0.28	19.6 ± 0.38	21.58 ± 0.22	23.1 ± 0.41	18.4 ± 0.16

TABLE B4. Morphometric measurements (*µm*) for species of *Iliocirrus*.
Means and standard error. ME, number of parasites measured; BL, body length; BW, body width; HW, haptor width; HL, haptor length; PD, pharynx diameter; DA1-6, dorsal anchor; VA1-6, ventral anchor; DB1-3, dorsal bar; VA1-2, ventral bar; H1-7, marginal hook length. ( ) range.

	I. iliocirrus	*I. trifasciatae*	*I. rossi*	*I. ornatusi*	*I. mazlini*
ME	49	31	33	51	32
BL	(100-160)	(100-170)	(100-160)	(120-180)	(130-220)
BW	(40-90)	(35-80)	(35-60)	(40-90)	(50-140)
HL	(25-50)	(20-40)	(30-60)	(25-60)	(25-50)
HW	(70-110)	(65-120)	(70-110)	(60-100)	(70-110)
PD	(7-13)	(9-13)	(9-13)	(12-18)	(12-21)
DA1	5.7 ± 0.11	5.3 ± 0.16	6.0 ± 0.15	5.5 ± 0.10	5.7 ± 0.13
DA2	22.2 ± 0.22	22.8 ± 0.15	27.4 ± 0.30	24.7 ± 0.21	22.5 ± 0.22
DA3	17.0 ± 0.18	17.1 ± 0.15	20.7 ± 0.21	18.1 ± 0.18	17.8 ± 0.28
DA4	19.8 ± 0.21	19.7 ± 0.25	24.9 ± 0.20	21.9 ± 0.20	20.5 ± 0.19
DA5	7.2 ± 0.16	7.6 ± 0.18	9.1 ± 0.28	8.6 ± 0.16	6.8 ± 0.17
DA6	9.7 ± 0.17	8.8 ± 0.24	10.8 ± 0.17	9.9 ± 0.16	9.5 ± 0.23
VA1	4.9 ± 0.11	4.5 ± 0.13	5.0 ± 0.16	5.2 ± 0.10	5.3 ± 0.13
VA2	32.4 ± 0.25	34.4 ± 0.21	38.1 ± 0.46	34.0 ± 0.25	36.0 ± 0.26
VA3	25.1 ± 0.20	25.3 ± 0.18	28.4 ± 0.27	24.2 ± 0.19	27.0 ± 0.24
VA4	31.0 ± 0.26	32.5 ± 0.24	35.5 ± 0.41	30.4 ± 0.25	34.9 ± 0.34
VA5	12.3 ± 0.21	13.5 ± 0.21	14.2 ± 0.33	12.5 ± 0.20	13.7 ± 0.23
VA6	14.3 ± 0.19	14.7 ± 0.16	15.9 ± 0.22	13.9 ± 0.19	15.6 ± 0.19
DB1	22.4 ± 0.24	24.1 ± 0.38	24.4 ± 0.34	23.6 ± 0.23	23.3 ± 0.34
DB2	3.9 ± 0.07	4.7 ± 0.17	5.9 ± 0.19	3.7 ± 0.07	4.8 ± 0.14
DB3	7.2 ± 0.12	9.1 ± 0.22	7.2 ± 0.18	7.1 ± 0.11	7.4 ± 0.16
VB1	26.5 ± 0.24	29.8 ± 0.27	30.8 ± 0.28	30.7 ± 0.24	30.9 ± 0.49
VB2	11.8 ± 0.16	10.5 ± 0.16	10.8 ± 0.20	12.2 ± 0.15	14.5 ± 0.22
H1	14.1 ± 0.15	14.2 ± 0.15	14.2 ± 0.18	13.4 ± 0.15	14.1 ± 0.13
H2	25.7 ± 0.23	27.6 ± 0.29	27.4 ± 0.29	24.2 ± 0.23	27.7 ± 0.36
H3	36.2 ± 0.30	33.0 ± 0.34	37.8 ± 0.30	30.6 ± 0.30	33.0 ± 0.47
H4	48.5 ± 0.31	44.6 ± 0.57	49.9 ± 0.34	37.9 ± 0.31	39.1 ± 0.39
H5	17.4 ± 0.16	17.4 ± 0.17	17.5 ± 0.20	17.6 ± 0.16	19.4 ± 0.22
H6	33.9 ± 0.27	33.5 ± 0.22	33.0 ± 0.38	27.1 ± 0.26	27.8 ± 0.33
H7	25.4 ± 0.24	25.9 ± 0.25	25.6 ± 0.47	21.5 ± 0.24	21.8 ± 0.24

TABLE B5. Principal component correlation between natural log/z-score transformed variables and principal component functions for all species.
Variables ordered by absolute size of correlation within function. DA1-6, dorsal anchor; VA1-6, ventral anchor; DB1-3, dorsal bar; VA1-2, ventral bar; H1-7, hook length.

	Component			
	1	2	3	4
%	48.56	18.23	9	7.3
DA2	*.911	.307	.084	-.147
DA2	*.911	.307	.084	-.147
DA4	*.910	.186	.156	-.173
DA1	*.905	.161	.020	.02
DA3	*.887	.161	.174	-.283
DA6	*.838	.207	-.044	.062
DA5	*.793	.312	.090	.026
DB3	*.732	.394	.118	.306
VA1	*.705	.040	.230	.380
H3	.290	*.850	.250	.129
H6	.256	*.826	.359	-.039
H7	.247	*.819	.050	-.019
H2	.312	*.818	.186	.101
H4	.551	*.775	.053	.092
DB2a	-.068	*.581	.391	-.085
DB1	.530	*.549	.0642	.525
VA3	.070	.144	*.941	.076
VA4	.078	.277	*.923	.084
VA2	.410	.246	*.845	-.049
VA6	-.140	.058	*.766	.453
VB1	.099	.159	*.668	.587
VA5	.477	.367	*.619	.038
VB2	-.144	-.024	.190	*.907

(%) percent total variance accounted for.
* Largest absolute correlation between each variable and any principal component.

TABLE B6. Principal component correlation between natural log/z-score transformed variables and principal component functions for species of *Recurvatus*.
DA1-6, dorsal anchor; VA1-6, ventral anchor; DB1-3, dorsal bar; VA1-2, ventral bar; H1-7, hook length.

	Component			
	1	2	3	4
	(39.8%)	(22.4%)	(16.4%)	(7.2%)
H2	* .942	.157	-.034	.000
H7	* .934	.189	-.030	-.003
H4	* .888	.268	.072	.014
VB1	*-.794	.107	.311	.083
DA3	*-.792	.488	.006	.068
DA4	*-.781	.510	.090	.033
H3	* .712	.311	.368	-.059
H6	* .617	.579	.09	-.123
VA1	*-.544	-.078	-.451	-.444
VA2	-.115	*.857	-.076	-.206
DA2	-.346	*.781	-.193	.171
VA5	.399	*.661	.156	-.324
VA4	-.522	*.600	.222	-.312
DA1	-.022	.330	*-.791	.268
VB2	-.370	.040	* .660	.381
DA5	.248	.510	-.153	*.653

(%) percent total variance accounted for.
* Largest absolute correlation between each variable and any principal component.

TABLE B7. Principal component correlation between natural variables and principal component functions for species of *Helicirrus*.
DA1-6, dorsal anchor; VA1-6, ventral anchor; DB1-3, dorsal bar; VA1-2, ventral bar; H1-7, hook length.

	Component		
	1	2	3
	(50.8%)	(29.4%)	(5.6%)
H4	*.972	.052	-.042
DB1	*.961	.113	-.039
H3	*.931	.164	-.037
DB3	*.929	.051	.008
DA2	*.910	-.308	.087
H2	*.887	.220	-.234
DA4	*.886	-.185	.181
DA5	*.850	-.065	.136
DA3	*.847	-.279	.129
DA1	*.833	-.114	.231
DA6	*.765	-.471	.207
H7	*.743	.077	-.552
H6	*.726	.322	-.512
VA1	*.612	.602	.234
VA2	.012	*.946	-.095
VA6	-.236	*.922	.104
VA4	-.228	*.893	.005
VA3	-.334	*.883	.006
VB1	.256	*.869	.264
VA5	.272	*.804	-.215
VB2	.362	*.665	.433

(%) percent total variance accounted for.

TABLE B8. Principal component correlation between log/z-score transformed variables and principal component functions for species of *Longidigitis*.
Variables ordered by absolute size of correlation within function. DA1-6, dorsal anchor; VA1-6, ventral anchor; DB1-3, dorsal bar; VA1-2, ventral bar; H1-7, hook length.

	Component			
	1	2	3	4
	(51.3%)	(14.5%)	(10.7%)	(6.8%)
DA2	*.958	-.195	-.033	-.005
VA2	*.950	.013	.003	-.123
DA4	*.943	-.149	.078	-.035
DA3	*.941	-.159	.0265	-.0621
VA4	*.937	.094	.122	-.127
VA3	*.897	.049	.126	-.024
DA1	*.806	-.299	.113	-.242
VA5	*.790	-.158	-.279	-.105
H2	*.750	.494	-.005	.005
DA5	*.699	-.505	-.213	.090
DA6	*.676	-.502	.093	.073
H7	*.643	.521	-.260	-.057
H3	.284	*.704	-.481	.090
H4	.402	*.695	.300	-.252
H6	.496	*.511	-.278	.459
VB2	-.104	.355	*.851	-.087
VB1	.415	.053	*.734	.363
DB1	.289	-.111	.088	*.828

(%) percent total variance explained.
* Largest absolute correlation between each variable and any principal component.

TABLE B9. Principal component correlation between natural log/z-score transformed variables and principal component functions for species of *Iliocirrus*.
Variables ordered by absolute size of correlation within function. DA1-6, dorsal anchor; VA1-6, ventral anchor; DB1-3, dorsal bar; VA1-2, ventral bar; H1-7, hook length.

	Component			
	1	2	3	4
	(37.5%)	(22.2%)	(12.5%)	(7.2%)
VA2	*.769	.456	.247	.044
VA4	*.709	.211	.475	-.079
H2	*.689	-.148	.456	.113
VA5	*.680	.161	.102	.452
H7	*.666	-.614	-.007	.128
DA4	*.661	.474	-.394	-.258
DA3	*.660	.373	-.264	-.458
H3	*.652	-.587	.073	-.015
DA2	*.649	.445	-.522	-.070
VA3	*.628	.194	.442	-.370
H6	.551	*-.756	-.054	.038
H4	.607	*-.721	-.109	-.040
VB1	.310	* .633	.154	.455
VB2	-.320	.393	* .570	.027
DA5	.408	.236	*-.558	.452

(%) percent total variance explained.
* Largest absolute correlation between each variable and any principal component.

TABLE B10. Pooled within-groups correlations between natural log/z-score transformed variables and standardized canonical discriminant functions for generic level grouping. Specimens entered as genera. Variables ordered by absolute size of correlation within function. DA1-6, dorsal anchor; VA1-6, ventral anchor; DB1-3, dorsal bar; VA1-2, ventral bar; H1-7, hook length.

	Function		
	1	2	3
	(76.1%)	(18.9%)	(5.0%)
DB2	* .500	.213	.073
VA2	* .205	.028	.040
VB2	-.012	* .440	.193
DA3	.154	*-.410	.177
VB1	.153	* .408	.134
DA4	.144	*-.348	.263
VA6	.075	* .298	.147
VA4	.227	* .267	-.058
H5	.122	* .252	-.012
VA3	.189	* .245	-.113
H1#	.028	* .129	.071
H2	.169	.091	*.605
H7	.101	.049	*.495
DA1	.068	-.280	*.453
H4	.144	-.077	*.411
DB1	.113	.088	*.402
DA5#	.085	-.164	*.389
DA2	.144	-.348	*.385
H6	.264	.050	*.375
VA5	.140	-.064	*.348
DB3#	.112	-.115	*.347
H3	.241	.088	*.309
DA6	.070	-.168	*.269
VA1	.047	-.156	*.231

(%) percent total variance explained.
* Largest absolute correlation between each variable and any discriminant function.
# Variable not used in the analysis.

TABLE B11. Pooled within-group correlations between natural log/z-score transformed variables and standardized canonical discriminant functions at species level grouping. Specimens entered as species groups. Variables ordered by absolute size of correlation within function. DA1-6, dorsal anchor; VA1-6, ventral anchor; DB1-3, dorsal bar; VA1-2, ventral bar; H1-7, hook length. Only functions with highest correlations shown.

	Function											
	1	2	4	5	6	7	9	10	11	14	15	17
%	54.8	22.8	5.5	2.9	1.9	1.5	1.2					
DB2	*.93	-.07	-.07	.08	-.10	.11	-.05	-.04	-.01	.01	.06	-.00
H4	.24	*.64	.08	-.23	-.01	-.11	.09	.34	-.02	.05	-.18	-.04
DA2	.08	*.54	.46	.03	.15	.29	-.12	.14	.22	.01	-.21	-.12
VA2	.13	.05	*.68	-.26	-.07	.14	-.14	-.05	-.07	.02	-.03	.12
VA3	.13	-.10	*.50	-.20	.15	.21	-.04	.21	.14	.08	.01	-.14
VA4	.17	-.08	*.50	-.19	.15	.26	.09	.12	-.17	.12	.13	-.08
DA3	.05	.34	*.47	-.05	.03	.19	.02	.23	.06	.10	.34	-.02
DA4	.05	.33	*.43	.02	.01	.16	-.02	.22	.09	.41	.16	-.03
VB2	.06	-.08	-.18	* .49	-.04	.04	-.15	.05	.38	.21	-.06	.08
H7	.06	.19	-.04	*-.36	.14	.33	-.05	.19	-.07	.22	.05	.24
H3	.21	.26	.10	-.27	*.63	-.09	.03	-.03	.00	.19	-.19	.16
H2	.11	.21	.06	-.22	.19	*.56	-.29	.02	.09	.04	.21	-.06
DA6	.02	.25	.14	.16	.25	*.37	.23	.31	-.21	-.04	.04	.21
VB1	.15	-.06	.23	.31	.17	.01	*-.45	.42	-.17	.04	.07	.13
H6	.14	.14	.14	-.40	.30	-.09	-.08	*.53	.09	-.02	.13	.08
VA6	.06	-.10	.27	.03	.06	.01	.32	*.36	-.03	.18	-.17	-.23
VA1	.02	.12	.21	.10	-.13	-.23	-.02	-.07	*.40	-.28	.11	.27
VA5	.06	.10	.34	-.15	-.07	-.04	.03	-.11	-.09	*.45	-.01	-.23
DA5	.02	.20	.24	-.01	.20	.20	.10	.06	.19	*.36	.01	.18
H5	.06	-.03	.15	.07	.19	.08	.14	.04	-.25	-.13	*-.41	.19
DB3	.08	.24	.27	.15	.14	-.05	.34	-.07	.08	-.16	* .38	-.07
DA1	.01	.23	.29	.05	-.16	.21	.30	.13	.28	-.02	.03	* .38
H1	.03	-.05	.09	-.09	.137	.24	.18	.25	.04	-.29	-.15	*-.36
DB1	.10	.23	.06	.18	.39	-.11	-.18	.10	-.24	.07	.22	-.07

(%) percent total variance explained.

* Largest absolute correlation between each variable and any discriminant function.

TABLE B12. Pooled within-group correlations between natural log/z-score transformed variables and standardized canonical discriminant functions for species of *Recurvatus*. Variables ordered by absolute size of correlation within function. DA1-6, dorsal anchor; VA1-6, ventral anchor; DB1-3, dorsal bar; VA1-2, ventral bar; H1-7, hook length.

	Function
	1
H2	.548
H7	.492
H3#	.309
H6#	.284
DB3#	-.243
H4#	.206
VA6#	.202
VA5#	.196
VB1	-.196
DB1#	.166
VA4	-.091
VA3#	-.078
DA6#	.071
VA2#	-.056
H1	.055
VA1#	.046
DA2#	.032
DA3#	.023
VB2#	.009
DA1#	-.006
H5#	-.006
DA4#	.006
DA5#	.003

Variable not used in the analysis.

TABLE B13. Pooled within-groups correlations between natural log/z-score transformed variables and standardized canonical discriminant functions for species of *Helicirrus*. Variables ordered by absolute size of correlation within function. DA1-6, dorsal anchor; VA1-6, ventral anchor; DB1-3, dorsal bar; VA1-2, ventral bar; H1-7, hook length.

	Function				
	1	2	3	4	5
	(74.8%)	(17.8%)	(4.0%)	(2.1%)	(1.2%)
H4	*.688	.286	-.129	-.169	.060
DB1	*.316	.175	.073	.244	-.038
DB3	*.233	.110	.053	.004	.196
VA2	-.046	*.552	-.345	.024	.090
VA6	-.121	*.542	-.045	.038	.285
VA3	-.129	*.388	-.117	.159	.383
VB1	.011	*.366	.122	-.013	.013
VA1	.086	*.260	.060	-.132	.004
H5#	-.052	*.258	-.004	-.093	.010
VB2	.044	.340	* .420	.095	-.264
VA5	.026	.305	*-.346	-.038	.061
H6	.124	.137	*-.278	.219	-.168
DA1	.166	.039	* .245	-.108	-.025
DA2#	.181	.038	* .198	-.196	.107
DA6#	.101	.091	* .144	.015	-.031
H7	.150	.052	-.309	* .486	-.132
H2	.196	.144	-.146	* .385	.162
DA5	.135	.026	.095	* .205	-.128
H1#	.046	.124	.081	*-.148	.012
DA3	.167	-.074	.046	-.107	*.385
VA4	-.092	.364	-.079	.230	*.378
DA4	.176	-.030	.092	-.116	*.372
H3	.236	.153	.062	.249	*.274

(%) percent total variance explained.
* Largest absolute correlation between each variable and any discriminant function.
# Variable not used in the analysis.

TABLE B14. Pooled within-groups correlations between natural log/z-score transformed variables and standardized canonical discriminant functions for species of *Longidigitis*.
Variables ordered by absolute size of correlation within function. DA1-6, dorsal anchor; VA1-6, ventral anchor; DB1-3, dorsal bar; VA1-2, ventral bar; H1-7, hook length.

	Function				
	1	2	3	4	5
	(48.5%)	(28.9%)	(11.8%)	(7.1%)	(3.6%)
DA2	*.452	.167	-.328	.040	-.356
DA3	*.416	.223	-.338	.021	-.389
DA1	*.340	.235	-.124	-.199	-.153
DA5	*.330	-.075	-.075	-.084	-.027
DA6	*.291	.060	.111	-.046	-.268
DB3	*.283	.135	.003	-.057	.275
H4	-.088	*.451	-.266	-.009	-.392
VA2	.399	*.274	-.587	.118	-.174
VA3	.337	*.233	-.504	.314	-.038
VA4	.324	*.322	-.478	.135	-.232
H7	.037	.106	*-.402	-.024	-.281
H3	-.078	-.024	*-.393	.019	-.304
H6	.026	-.041	*-.363	.358	-.357
H1	.171	.021	*-.187	.052	.113
VB1	.143	.239	.140	*.713	.015
VB2	-.118	.357	.200	*.386	.370
DA4	.384	.238	-.244	.044	*-.481
H2#	.029	.175	-.287	.158	*-.292
VA5#	.208	.032	-.119	-.015	*-.287
H5	.214	-.060	.028	-.014	*-.250
VA6#	.120	.102	-.085	-.102	*-.240
DB1	.065	-.032	.096	.120	*-.173
VA1	.148	-.023	.083	.140	*-.150
DA2	.452	.167	-.328	.040	*-.356

(%) percent total variance explained.
* Largest absolute correlation between each variable and any discriminant function.
# This variable not used in the analysis.

TABLE B15. Pooled within-group correlations between natural log/z-score transformed discriminating variables and standardized canonical discriminant functions for species of *Iliocirrus.*
Variables ordered by absolute size of correlation within function. DA1-6, dorsal anchor; VA1-6, ventral anchor; DB1-3, dorsal bar; VA1-2, ventral bar; H1-7, hook length.

	Function			
	1 (58.4%)	2 (18.5%)	3 (14.5%)	4 (8.6%)
H4	*-.514	-.050	.299	.056
H6	*-.387	-.021	.011	.234
H3	*-.251	.086	.181	-.023
VA6#	*-.163	-.099	.001	.108
VB2	.201	* .437	-.200	-.252
DA5	.041	*-.338	.133	.025
H5	.093	* .209	-.018	.179
DA6#	-.092	*-.202	.199	.195
DB2	-.033	.110	* .572	.004
VA3	-.009	.197	* .557	.076
VA4	.007	.227	* .456	.206
VA2#	.060	.092	* .424	.153
DA4	.072	-.283	* .417	-.147
DA2	.082	-.378	* .403	-.103
DA3#	-.020	-.123	* .367	-.104
VB1	.255	-.060	* .280	.222
DB1#	-.009	-.062	* .244	.201
VA1#	.008	-.071	*-.142	-.051
DA1#	.069	.022	* .122	-.076
H2	-.070	.166	.318	*.478
DB3	-.023	.019	-.003	*.317
H1	-.082	.059	.105	*.247
H7#	-.165	.049	.212	*.221
VA5#	-.018	.050	.026	*.052

(%) percent total variance explained.
* Largest absolute correlation between each variable and any discriminant function.
# This variable not used in the analysis.

APPENDIX C CHAPTER 5 TABLES

TABLE C1. Means of morphometric measurements for species of *Recurvatus* mean, ( ) range, # sample size and one standard deviation

	R. chelatus #91		*R. signiferi #49*	
	Mean	SD	Mean	SD
DA1	6.85(5-9)	.977	6.78(5-8)	.702
DA2	23.55(20-28)	1.805	22.22(19-24)	1.137
DA3	17.62(15-21)	1.308	15.04(13-17)	.807
DA4	21.38(18-24)	1.596	18.48(17-21)	.814
DA5	7.95(6-10)	1.022	8.36(7-10)	.942
DA6	10.80(7-13)	1.137	9.56(8-12)	.929
VA1	5.92(4-8)	.836	5.15(4-6)	.607
VA2	28.78(24-34)	2.031	27.08(23-30)	1.426
VA3	21.48(18-26)	1.713	19.15(17-21)	1.036
VA4	26.12(23-30)	1.813	23.23(21-26)	1.198
VA5	11.69(7-14)	1.329	12.23(9-14)	1.293
VA6	13.92(11-16)	1.211	13.19(10-15)	1.030
DB1	25.73(22-32)	2.457	21.80(13-26)	1.990
DB3	8.2(6-11)	1.070	6.20(5-8)	.881
VB1	29.11(25-35)	2.193	23.44(19-27)	1.618
VB2	13.58(11-17)	1.134	11.96(10-15)	1.264
H1	12.38(10-15)	.944	13.71(10-17)	1.601
H2	21.47(17-25)	1.552	29.42(24-34)	2.118
H3	25.80(21-31)	2.036	26.92(23-31)	1.937
H4	37.29(32-43)	2.409	42.83(35-48)	2.431
H5	15.25(11-18)	1.754	15.10(13-17)	.891
H6	24.88(21-30)	1.941	25.56(21-30)	1.539
H7	20.48(17-24)	1.541	28.27(23-32)	2.206

TABLE C2. Morphometric measurements for species of *Helicirrus*; mean ( ) range, # sample size and one standard deviation.

	H. gertrudaea #15		*H. maccullochi* #10		*H. marjoriaea* #42		*H. mcivori* #18		*H. megaloanchor* #33		*H. splendidae* #97	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
DA1	3.67(3 -5)	.724	1.80(1 -4)	.919	6.05(5 -8)	.661	5.00(4 -7)	.970	1.22(1 -3)	.573	2.02(0 -5)	.908
DA2	18.27(16-20)	1.223	11.20(9 -13)	1.229	20.81(19-23)	.890	19.50(16-22)	1.618	6.66(5 -12)	1.406	10.75(7 -18)	1.942
DA3	14.20(13-15)	.775	12.60(11-14)	.966	15.74(14-18)	.734	15.06(12-17)	1.697	8.17(6 -11)	1.282	11.49(8 -20)	1.641
DA4	16.60(15-18)	.910	14.10(13-15)	.876	19.43(18-21)	.859	18.00(14-21)	2.351	9.56(7 -14)	1.435	13.78(10-22)	1.829
DA5	7.07(5 -9)	1.100	2.50(2 -3)	.527	7.17(6 -9)	.824	5.28(4 -7)	.826	2.37(1 -7)	1.182	4.06(2 -8)	1.104
DA6	8.60(7 -11)	1.352	5.50(4 -6)	.707	10.21(8 -12)	1.048	8.50(7 -10)	.924	2.94(1 -7)	1.243	6.72(3 -10)	1.426
VA1	3.87(3 -5)	.640	2.10(2 -3)	.316	5.76(5 -8)	.656	4.78(4 -6)	.548	8.51(2 -13)	2.299	1.93(1 -5)	.670
VA2	27.93(26-30)	1.335	26.00(23-30)	1.944	27.33(25-30)	1.028	26.11(22-29)	1.676	40.18(36-47)	2.098	21.31(16-28)	1.996
VA3	20.40 (18-22)	1.121	23.40(20-25)	1.430	21.36(20-23)	.821	18.50(15-21)	1.654	31.88(22-37)	2.088	19.79(12-27)	1.844
VA4	25.00(23-27)	1.254	27.40(25-29)	1.265	26.33(24-28)	1.183	22.61(18-26)	2.004	37.91(27-43)	2.467	23.21(16-28)	1.884
VA5	11.47(10-13)	1.060	8.30(6-11)	1.494	9.71(8 -13)	1.043	10.11(7 -13)	1.491	16.05(12-20)	1.754	6.43(4 -10)	1.141
VA6	11.87(10-14)	1.187	13.40(12-15)	1.265	13.83(12-15)	.853	11.39(10-12)	.698	25.58(20-32)	1.942	11.15(6 -15)	1.390
DB1	24.27(22-26)	.961	10.50(9 -13)	1.179	25.67(23-29)	1.476	20.39(18-25)	1.650	12.73(10-17)	1.326	12.57(8 -17)	1.974
DB3	6.07(5 -7)	.704	2.30(2 -3)	.483	7.57(6 -9)	.887	5.67(4 -7)	.840	2.58(1 -4)	.692	2.54(1 -5)	.835
VB1	24.13(21-26)	1.356	21.80(20-23)	1.033	28.45(26-32)	1.501	24.94(23-29)	1.626	36.97(28-44)	3.321	23.53(20-30)	2.219
VB2	10.93(9 -12)	.961	7.70(6 -9)	.949	15.43(12-19)	1.382	11.56(10-13)	.922	18.63(14-23)	1.981	11.32(6 -18)	1.679
H1	12.20(11-13)	.676	13.20(11-16)	1.317	13.31(11-16)	1.137	12.33(10-15)	1.455	14.80(12-17)	1.335	14.30(10-17)	1.475
H2	24.47(23-25)	.743	16.10(15-17)	.738	22.60(20-25)	1.127	18.89(16-23)	1.811	17.94(15-21)	1.401	16.48(12-20)	1.353
H3	30.27(27-32)	1.223	16.10(15-17)	.738	30.43(27-35)	1.863	22.61(21-25)	1.243	17.86(15-20)	1.090	16.94(14-20)	1.073
H4	39.33(37-42)	1.345	16.10(15-17)	.568	41.48(38-46)	1.838	38.06(36-41)	1.626	17.54(14-20)	1.148	17.23(15-20)	1.139
H5	15.87(14-17)	.915	13.70(12-16)	1.160	17.62(15-20)	1.188	16.22(15-18)	1.003	17.62(15-21)	1.325	15.02(10-20)	1.812
H6	27.47(25-30)	1.302	17.80(16-20)	1.229	22.95(20-26)	1.447	22.11(19-25)	1.530	20.88(13-25)	1.965	18.77(14-21)	1.594
H7	26.80(24-29)	1.474	16.90(15-20)	1.370	21.10(18-23)	1.165	19.17(15-22)	2.383	18.22(15-21)	1.385	17.41(15-20)	1.053

TABLE C3. Morphometric measurements for species of *Longidigitis*; mean ( ) range, # sample size and one standard deviation.

	L. auripontiformis #478		*L. robustus #20*		*L. gracilis #118*		*L. maccullochi #46*		*L. utcheei #27*		*L. hopevalensis #17*	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
DA1	9.38(6-12)	.931	6.56(4-10)	1.325	4.68(4-7)	.739	5.53(4-7)	.620	6.30(4-8)	.912	7.76(6-9)	.831
DA2	30.76(24-37)	2.212	26.38(23-29)	1.329	19.73(16-23)	1.386	23.00(20-25)	1.285	26.89(23-31)	2.100	29.24(27-31)	1.147
DA3	23.35(18-28)	1.857	19.27(16-21)	1.218	15.48(13-18)	1.097	17.83(15-22)	1.204	20.74(19-23)	.903	21.88(20-24)	1.111
DA4	26.81(21-33)	1.878	22.73(20-25)	1.313	18.54(15-21)	1.357	20.30(18-24)	1.317	23.93(22-26)	1.238	24.41(22-26)	1.064
DA5	9.80(6-14)	1.414	10.77(8-14)	1.306	5.71(3-8)	.981	6.96(5-9)	.932	7.44(5-10)	1.251	10.71(9-14)	1.611
DA6	12.67(9-16)	1.443	12.44(7-16)	2.043	8.04(5-11)	1.357	8.26(7-11)	.988	9.89(9-11)	.641	11.76(8-14)	1.640
VA1	5.97(5-9)	.727	6.50(5-9)	1.030	4.60(3-7)	.775	4.62(4-6)	.573	5.56(5-7)	.641	6.00(5-7)	.707
VA2	34.93(26-42)	2.597	26.85(22-31)	1.666	22.46(19-26)	1.654	27.64(24-34)	1.661	31.81(29-35)	1.520	34.12(32-36)	1.054
VA3	22.59(18-27)	1.661	18.19(16-20)	1.327	16.34(13-19)	1.093	18.87(16-21)	1.296	22.15(21-24)	.864	24.00(23-26)	1.061
VA4	27.68(21-34)	2.102	21.85(20-25)	1.223	20.13(17-23)	1.320	22.87(19-28)	1.555	26.33(25-29)	1.271	27.06(25-30)	1.298
VA5	13.96(10-19)	1.737	11.85(10-15)	1.592	8.38(6-11)	1.243	11.11(9-16(	1.272	11.44(8-14)	1.423	12.65(11-15)	1.272
VA6	11.97(9-16)	1.251	13.27(10-16)	1.485	9.98(7-13)	1.215	9.74)8-12(	.793	10.93(9-12)	.829	12.88(10-15)	1.364
DB1	20.32(15-26)	1.670	20.80(18-23)	1.472	19.26(16-24)	1.644	17.79)16-20)	1.062	20.22(16-23)	1.649	19.47(16-21)	1.068
DB2a	.00	.000	.00	.000	3.98(3-6)	.768	.00	.000	.00	.000	.00	.000
DB3	8.00(5-10)	.944	6.00(4-8)	.885	5.28(3-9)	.963	5.32(4-7)	.695	5.52(4-7)	.643	8.59(8-10)	.618
VBl	24.55(19-32)	2.177	20.43(18-24)	1.273	22.09(17-27)	1.912	19.53(17-22)	1.100	24.63(22-28)	1.497	25.65(24-28)	1.320
VB2	9.35(7-13)	1.053	5.22(2-7)	1.313	11.34(8-15)	1.279	8.00(7-10)	.919	9.33(8-11)	.877	9.53(8-10)	.624
H1	12.83(9-16)	1.198	12.72(10-15)	1.400	11.32(9-15)	1.137	11.98(10-14)	.872	12.44(11-15)	1.121	14.06(12-16)	1.029
H2	23.20(17-32)	2.678	19.12(17-22)	1.481	19.3491-25)	2.040	20.83(18-24)	1.434	23.33(20-27)	2.304	20.82(18-23)	1.074
H3	24.86(17-34)	2.744	24.08(21-26)	1.579	24.66(20-32)	2.778	26.62(22-30)	1.895	27.30(24-32)	2.035	22.53(18-25)	1.586
H4	40.84(30-55)	4.061	29.00(26-32)	1.915	38.91(32-47)	3.312	36.91(32-40)	1.875	40.30(36-46)	2.933	33.00(28-36)	1.803
H5	15.38(10-20)	1.702	17.38(16-18)	.824	13.94(10-17)	1.548	14.09(12-16)	.830	15.19(14-17)	.736	16.00(14-18)	.935
H6	23.98(16-31)	2.184	23.72(19-27)	2.052	22.65(18-29)	2.219	24.11(21-28)	1.402	28.19(24-33)	2.338	24.06(22-26)	1.197
H7	22.86(17-30)	2.293	19.44(17-23)	1.635	18.48(14-24)	1.866	21.57(19-26)	1.557	22.78(20-26)	1.908	20.06(18-22)	1.197

TABLE C4. Morphometric measurements for *H. gertrudaea*, *H. maccullochii*, *H. marjoriaea* and *H. mcivori* from each sample location.

Parasite sp.	*H. gertrudaea*			*H. maccullochii*			*H. marjoriaea*			*H. mcivori*								
Host sp.	*P. gertrudae*			*M. maccullochi*			*C. marjoriae*			*M. trifasciata*								
Location	Howard Ck.			McIvor R. 1			Amamoor Ck.			Dulhunty R.			McIvor R.			Wenlock R.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
Bl	92.33	80	100	252.22	130	600	127.65	90	150	130.00	130	130	131.00	90	160	120.00	120	120
BW	31.00	25	40	77.78	50	100	78.09	50	120	40.00	40	40	37.00	20	50	40.00	40	40
HL	28.33	20	35	35.56	25	50	32.86	20	50	30.00	30	30	30.00	25	40	30.00	30	30
HW	63.67	50	80	62.22	50	80	87.64	60	120	70.00	70	70	68.00	40	90	50.00	50	50
PD	9.63	8	12	22.50	17	30	11.28	9	16	10.00	10	10	9.50	7	11	10.00	10	10
DA1	3.67	3	5	1.80	1	4	6.07	5	8	5.67	5	7	4.86	4	7	5.50	5	6
DA2	18.27	16	20	11.20	9	13	20.83	19	23	19.67	16	22	20.07	17	29	20.00	20	20
DA3	14.20	13	15	12.60	11	14	15.73	14	18	15.33	14	17	15.36	12	23	16.50	16	17
DA4	16.60	15	18	14.10	13	15	19.44	18	21	18.67	16	21	18.36	14	28	19.50	19	20
DA5	7.07	5	9	2.50	2	3	7.17	6	9	6.00	5	7	5.64	4	12	5.00	4	6
DA6	8.60	7	11	5.50	4	6	10.22	8	12	8.33	7	10	8.79	7	14	9.50	9	10
VA1	3.87	3	5	2.10	2	3	5.78	5	8	5.00	5	5	4.79	4	6	5.00	5	5
VA2	27.93	26	30	26.00	23	30	27.37	25	30	27.00	26	28	26.14	22	33	28.00	27	29
VA3	20.40	18	22	23.40	20	25	21.37	20	23	19.67	18	21	18.57	15	24	19.00	18	20
VA4	25.00	23	27	27.40	25	29	26.34	24	28	24.67	24	25	22.43	18	30	24.50	23	26
VA5	11.47	10	13	8.30	6	11	9.71	8	13	10.67	10	11	9.93	7	13	11.50	11	12
VA6	11.87	10	14	13.40	12	15	13.83	12	15	11.33	11	12	11.71	10	16	11.50	11	12
DB1	24.27	22	26	10.50	9	13	25.68	23	29	20.67	20	22	20.43	18	28	23.50	22	25
DB2	.00	0	0	.00	0	0	.00	0	0	.00	0	0	.00	0	0	.00	0	0
VB1	24.13	21	26	21.80	20	23	28.41	26	32	26.00	25	28	25.07	23	33	26.50	24	29
VB2	10.93	9	12	7.70	6	9	15.44	12	19	11.00	10	12	11.93	11	14	11.00	10	12
H1	12.20	11	13	13.20	11	16	13.24	11	15	12.33	12	13	12.43	10	15	13.00	13	13
H2	24.47	23	25	16.10	15	17	22.61	20	25	21.67	21	23	19.14	16	27	17.00	17	17
H3	30.27	27	32	16.10	15	17	30.51	28	35	23.00	21	25	22.93	21	28	22.50	22	23
H4	39.33	37	42	16.10	15	17	41.56	38	46	39.67	38	41	38.14	36	43	37.50	36	39
H5	15.87	14	17	13.70	12	16	17.61	15	20	16.00	15	17	16.50	15	20	16.50	16	17
H6	27.47	25	30	17.80	16	20	22.98	20	26	23.00	20	25	21.93	19	24	20.50	19	22
H7	26.80	24	29	16.90	15	20	21.10	18	23	19.33	18	20	19.50	15	22	17.00	15	19

TABLE C5. Morphometric measurements for *H. megaloanchor* from each sample location

Host sp.	*M. s. splendida*															"*M. eachutchee*"		
Location	Kangaroo Ck.			Bluewater Ck.			Liverpool Ck.			Roaring Meg Ck.			Tungamull Ck.			Barron R.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
B1				209.67	170	277	152.00	130	170							150.00	150	150
BW				62.22	50	80	58.00	45	75							55.00	55	55
HL				67.22	50	90	39.00	35	45							40.00	40	40
HW				67.78	50	85	78.00	60	90							80.00	80	80
PD				13.56	10	18	15.00	13	17							11.00	11	11
DA1	1.00	1	1	2.44	1	3	1.00	1	1	1.00	1	1	1.00	1	1	1.00	1	1
DA2	6.55	5	9	5.67	5	7	8.67	7	12	7.00	7	7	7.00	7	7	8.33	7	10
DA3	7.82	6	10	7.67	7	9	10.33	9	11	9.00	9	9	9.00	9	9	9.33	8	11
DA4	9.36	7	11	9.56	8	12	12.00	10	14	10.00	10	10	11.00	11	11	10.00	9	11
DA5	1.82	1	2	2.44	2	3	5.33	4	7	2.00	2	2	2.00	2	2	1.50	1	2
DA6	2.55	2	4	1.89	1	2	5.50	4	7	2.00	2	2	4.00	4	4	2.33	2	3
VA1	10.36	6	13	5.56	4	8	5.83	2	8	8.00	8	8	11.00	11	11	8.00	6	10
VA2	39.36	36	42	38.56	36	40	41.50	40	43	38.00	38	38	39.00	39	39	41.00	40	42
VA3	30.73	30	32	32.00	30	34	34.00	32	35	33.00	33	33	31.00	31	31	31.33	30	32
VA4	37.45	35	39	37.67	35	40	39.33	37	41	42.00	42	42	38.00	38	38	38.67	36	40
VA5	17.00	16	18	13.78	12	16	16.17	13	19	20.00	20	20	17.00	17	17	16.33	15	18
VA6	26.09	23	27	25.56	23	27	24.83	20	27	32.00	32	32	26.00	26	26	23.67	22	26
DB1	13.09	13	14	12.67	12	14	13.00	12	14									
DB2a	.00	0	0	.00	0	0	.00	0	0				.00	0	0			
VB1	37.45	32	39	31.00	28	34	39.83	35	44	38.00	38	38	36.00	36	36	40.67	40	41
VB2	18.91	14	23	15.33	14	16	19.33	18	20	18.00	18	18	20.00	20	20	19.33	18	21
H1	15.45	14	17	13.89	12	16	15.50	14	17	16.00	16	16	14.00	14	14	16.33	16	17
H2	19.27	17	20	16.89	15	18	17.50	16	20	20.00	20	20	18.00	18	18	17.33	17	18
H3	18.36	17	20	17.11	15	20	17.33	16	19	18.00	18	18	19.00	19	19	18.67	18	19
H4	18.27	17	20	16.22	14	18	17.50	16	20	19.00	19	19	18.00	18	18	18.00	18	18
H5	17.64	16	20	16.56	15	18	18.40	17	20	17.00	17	17	18.00	18	18	19.33	19	20
H6	20.82	17	23	21.11	20	22	20.33	19	22	22.00	22	22	22.00	22	22	18.33	13	22
H7	18.91	17	21	17.11	16	18	17.50	16	18	20.00	20	20	20.00	20	20	17.67	17	18

TABLE C6. Morphometric measurements for *H. megaloanchor* from each sample location

Host sp.	*M. maccullochi*			*M. australis*			*M. duboulayi*			*M. s. inornata*								
Location	Corduroy Ck.			Mary R.			Granite Ck.			Chinaman Ck.			Oscar Ck.			Wenlock R.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
B1	200.00	200	200				170.00	170	170	136.67	110	150	153.33	150	160	130.00	120	150
BW	200.00	200	200				68.75	50	80	63.33	60	70	50.00	40	60	61.67	60	65
HL	70.00	70	70				38.33	35	40	40.00	35	45	50.00	50	50	43.33	40	45
HW	60.00	60	60				67.50	60	80	90.00	90	90	86.67	80	90	90.00	90	90
PD	15.00	15	15				14.00	14	14	13.00	13	13	13.00	13	13	12.67	12	14
DA1	1.00	1	1	1.00	1	1	1.00	1	1	1.00	1	1	1.33	1	2	1.00	1	1
DA2	5.33	5	6	6.00	5	7	7.00	5	8	6.43	5	8	7.00	6	8	7.00	7	7
DA3	6.67	6	7	7.25	6	8	7.60	6	10	8.00	6	9	9.00	8	10	8.75	8	9
DA4	8.00	7	9	8.50	8	9	8.60	7	11	9.21	8	10	10.67	10	12	9.75	9	10
DA5	2.00	2	2	2.00	2	2	1.80	1	2	2.15	1	3	3.00	2	4	1.50	1	2
DA6	2.50	2	3	2.50	2	3	1.80	1	2	3.15	2	4	4.67	3	6	3.25	3	4
VA1	8.67	7	10	9.25	7	12	8.40	7	10	9.00	6	12	9.67	9	10	10.25	9	11
VA2	40.67	39	42	39.50	36	43	40.00	39	41	42.14	40	47	40.00	37	42	39.00	38	41
VA3	31.33	30	33	31.25	28	33	31.80	31	34	33.07	30	37	32.00	31	33	31.25	30	34
VA4	36.00	35	38	36.00	31	38	37.60	36	39	39.36	37	43	38.00	36	39	37.25	35	40
VA5	15.00	15	15	16.50	15	17	15.20	13	16	17.00	15	19	15.33	13	17	15.75	13	17
VA6	24.50	24	25	25.50	24	27	23.80	20	26	26.57	24	30	24.00	23	25	25.75	25	26
DB1	11.33	10	12				13.75	11	17	11.50	11	12	11.00	11	11	12.50	10	15
DB2	.00	0	0	.00	0	0	.00	0	0	.00	0	0	.00	0	0	.00	0	0
VB1	37.33	37	38	36.25	35	39	36.20	31	38	37.43	35	40	37.33	35	39	40.50	40	42
VB2	19.33	18	20	20.00	20	20	18.20	16	20	19.07	17	22	18.67	16	20	20.25	20	21
H1	13.67	13	14	14.75	14	16	14.00	12	17	15.00	13	17	12.67	12	13	15.50	15	16
H2	19.00	17	21	17.75	17	19	17.00	16	19	17.75	16	20	18.33	18	19	18.00	16	19
H3	18.67	18	20	17.00	17	17	17.60	16	19	17.75	16	19	18.00	18	18	18.75	17	20
H4	17.33	16	18	17.50	17	18	17.40	16	18	17.33	16	19	18.00	17	19	18.00	17	19
H5	16.67	16	17	18.00	17	19	17.50	17	19	17.93	15	21	16.67	16	17	18.00	17	19
H6	22.33	21	25	21.75	21	23	22.00	21	23	19.93	17	23	20.33	20	21	22.25	21	25
H7	19.67	19	20	17.75	15	19	19.00	17	21	17.92	16	20	17.33	17	18	19.00	17	20

TABLE C7. Morphometric measurements for *H. splendidae* from each sample location.

Host sp.	*M. australis*									*M. duboulayi*								
Location	Camp Ck.			Dawn Ck.			Drysdale R.			Pentacoste R.			Beerburrum Ck.			Tuan Ck.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
Bl				230.00	230	230	156.67	140	170	180.00	170	190				140.00	130	150
BW				80.00	80	80	80.00	70	100	130.00	120	140				70.00	50	90
HL				30.00	30	30	30.00	25	35	35.00	30	40				35.00	30	40
HW				60.00	60	60	56.67	50	60	65.00	60	70				47.50	45	50
PD				15.00	15	15				17.00	17	17				15.00	15	15
DA1	2.00	2	2				2.00	2	2	2.50	2	3	1.00	1	1	1.00	1	1
DA2	11.00	11	11	10.00	10	10	8.33	7	9	9.50	7	12	13.00	13	13	9.50	9	10
DA3	12.50	12	13				9.67	8	11	11.00	11	11	13.00	13	13	11.00	10	12
DA4	14.50	14	15				12.33	10	14	13.50	13	14	16.00	16	16	13.50	13	14
DA5	3.50	3	4				5.33	4	8	5.00	5	5	3.00	3	3	4.00	3	5
DA6	7.50	7	8				8.33	8	9	6.50	5	8	5.00	5	5	6.00	5	7
VA1	1.50	1	2	3.00	3	3	1.67	1	2	2.00	2	2	1.00	1	1	2.00	2	2
VA2	19.50	17	22	16.00	16	16	20.67	19	22	21.50	21	22	22.00	22	22	21.00	20	22
VA3	20.00	19	21	12.00	12	12	19.67	19	20	23.00	19	27	21.00	21	21	20.50	20	21
VA4	23.00	22	24	16.00	16	16	23.00	22	24	25.50	24	27	23.00	23	23	22.00	20	24
VA5	7.50	7	8	6.00	6	6	6.67	6	7	5.00	4	6	7.00	7	7	6.00	6	6
VA6	10.50	10	11	10.00	10	10	10.33	10	11	11.50	11	12	10.00	10	10	8.50	8	9
DB1	15.00	13	17	16.00	16	16	9.67	8	11	14.00	12	16	10.00	10	10	10.50	10	11
DB2a	.00	0	0	.00	0	0	.00	0	0	.00	0	0	.00	0	0	.00	0	0
VB1	22.50	21	24	23.00	23	23	23.33	22	25	27.00	26	28	25.00	25	25	25.00	25	25
VB2	10.50	10	11	11.00	11	11	13.00	12	14	13.50	12	15	13.00	13	13	11.50	11	12
H1	14.50	14	15				13.67	10	17	14.00	13	15	16.00	16	16	13.00	11	15
H2	14.50	14	15	18.00	18	18	17.33	17	18	16.00	15	17	18.00	18	18	16.50	16	17
H3	16.00	16	16	16.00	16	16	16.33	16	17	16.00	16	16	18.00	18	18	16.50	16	17
H4	16.00	16	16	18.00	18	18	17.00	16	18	17.50	16	19	17.00	17	17	16.50	16	17
H5	16.00	16	16	10.00	10	10	15.67	15	17	13.00	12	14	17.00	17	17	13.00	12	14
H6	17.00	17	17	18.00	18	18	19.67	19	20	17.00	17	17	20.00	20	20	19.50	19	20
H7	16.00	16	16	15.00	15	15	16.67	16	17	17.50	17	18	20.00	20	20	17.50	17	18

TABLE C8. Morphometric measurements for *H. splendidae* from each sample location.

Host sp.	*M. eachamensis*			*M. exquisita*			*M. maccullochi*						"*M. eachutchee*"					
Location	Dirran Ck.			Moline Rockpool			Corduroy Ck.			Barron R.			Nigger Ck.			Williams Ck.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
Bl	190.00	140	230	166.67	150	180	393.33	200	500				195.00	160	230	195.00	180	220
BW	102.50	70	140	110.00	100	120	106.67	80	140				115.00	110	120	128.33	100	150
HL	32.50	30	40	40.00	30	50	70.00	30	100				35.00	30	40	35.83	30	45
HW	60.00	50	70	66.67	50	80	130.00	90	160				65.00	60	70	68.33	50	110
PD	19.75	18	23	18.33	17	20	30.00	30	30				23.00	21	25	20.75	20	22
DA1	1.83	1	3	2.00	2	2	2.00	2	2	1.00	1	1	2.67	2	3	2.50	2	5
DA2	10.83	8	13	8.67	7	10	10.25	9	12	9.00	9	9	13.67	13	14	13.17	12	15
DA3	11.83	10	13	11.33	10	12	10.50	10	12	10.00	10	10	12.00	12	12	14.50	13	16
DA4	13.83	12	15	13.67	13	14	12.50	12	13	12.00	12	12	14.00	14	14	17.50	15	20
DA5	3.67	3	5	3.67	3	4	2.25	2	3	3.00	3	3	4.33	4	5	4.00	3	5
DA6	6.17	4	8	5.33	4	7	6.00	4	7	6.00	6	6	6.67	6	8	6.83	6	8
VA1	2.20	2	3	2.33	2	3	1.75	1	2	1.00	1	1	1.67	1	2	2.17	2	3
VA2	22.83	21	26	21.00	20	23	19.75	19	20	20.00	20	20	21.67	20	24	26.17	24	28
VA3	20.60	20	21	19.33	18	21	19.75	19	20	19.00	19	19	20.33	20	21	23.17	22	25
VA4	24.00	23	25	23.33	22	25	22.75	22	24	23.00	23	23	23.67	23	24	27.17	26	28
VA5	6.20	6	7	6.67	6	7	6.00	6	6	6.00	6	6	6.67	5	8	8.67	7	10
VA6	11.50	11	12	11.67	11	12	10.50	10	11	6.00	6	6	11.67	9	14	13.67	12	15
DB1	11.40	10	13	14.33	13	15	10.00	10	10	14.00	14	14	15.00	15	15	13.00	13	13
DB2a	.00	0	0	.00	0	0	.00	0	0	.00	0	0	.00	0	0	.00	0	0
VB1	23.17	22	25	23.00	23	23	20.00	20	20	23.00	23	23	25.67	25	27	28.00	25	30
VB2	11.50	11	12	11.33	11	12	10.50	10	12	14.00	14	14	12.67	11	14	9.60	8	13
H1	13.67	13	14	11.67	10	13	15.00	14	16	15.00	15	15	15.00	15	15	14.33	13	16
H2	16.60	16	17	16.33	14	18	15.25	14	16	15.00	15	15	16.33	15	18	18.00	16	20
H3	16.83	16	18	18.33	18	19	16.25	16	17	17.00	17	17	16.67	16	18	18.17	17	20
H4	16.50	16	17	18.33	17	19	16.25	16	17	15.00	15	15	18.00	18	18	17.33	15	20
H5	14.67	14	17	14.00	13	15	15.25	14	16	15.00	15	15	16.33	15	17	16.50	15	18
H6	18.17	17	19	20.33	20	21	19.50	18	20	16.00	16	16	18.67	18	20	19.00	18	20
H7	16.50	16	17	18.67	18	20	17.75	16	20	17.00	17	17	17.33	16	19	17.50	17	18

TABLE C9. Morphometric measurements for *H. splendidae* from each sample location.

Host sp.	*M. utcheensis*			*M. s. inornata*									*R. ornatus*			*M. trifasciata*		
Location	Utchee Ck.			Chinaman Ck.			Manton Ck.			Wenlock R.			Brunswick R.			Moline Rockpool		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
B1	171.50	140	250	170.00	140	200	160.00	160	160				180.00	180	180	120.00	110	130
BW	103.50	80	130	95.38	60	130	85.00	85	85				140.00	140	140	66.67	50	100
HL	28.75	15	35	35.56	30	45	50.00	50	50							28.33	25	30
HW	54.75	40	60	63.64	50	80	80.00	80	80							46.67	40	50
PD	18.00	18	18	16.50	15	20	22.00	22	22	20.00	20	20				14.33	14	15
DA1	1.35	1	2	2.06	0	3	1.00	1	1	2.00	2	2	2.00	2	2	1.33	1	2
DA2	9.45	8	12	11.25	8	18	13.00	13	13	8.00	8	8	8.00	8	8	10.33	10	11
DA3	11.15	9	13	12.25	10	20	12.00	12	12	8.00	8	8	10.00	10	10	12.00	11	13
DA4	13.90	12	17	14.44	12	22	16.00	16	16	10.00	10	10	13.00	13	13	15.00	14	16
DA5	4.50	3	6	3.87	3	5	6.00	6	6	5.00	5	5	3.00	3	3	2.33	2	3
DA6	7.25	4	10	6.87	4	8	8.00	8	8	7.00	7	7	4.00	4	4	4.33	4	5
VA1	1.75	1	2	1.62	1	2	1.00	1	1	2.00	2	2	2.00	2	2	1.67	1	2
VA2	20.65	17	22	21.06	19	23	20.00	20	20	17.00	17	17	19.00	19	19	22.67	22	23
VA3	19.30	15	21	19.75	19	20	19.00	19	19	18.00	18	18	18.00	18	18	22.00	21	23
VA4	22.95	18	25	23.00	21	25	24.00	24	24	21.00	21	21	23.00	23	23	26.00	25	27
VA5	6.70	6	8	6.56	5	8	8.00	8	8	6.00	6	6	6.00	6	6	7.33	7	8
VA6	11.25	10	13	11.44	9	14	12.00	12	12	11.00	11	11	11.00	11	11	12.33	11	13
DB1	12.55	10	15	12.81	10	14	14.00	14	14	13.00	13	13	12.00	12	12	9.67	9	10
DB2	.00	0	0	.00	0	0	.00	0	0	.00	0	0				.00	0	0
VB1	24.90	20	29	23.19	20	25	28.00	28	28	25.00	25	25	25.00	25	25	21.67	20	23
VB2	11.45	10	18	11.38	9	13	15.00	15	15	15.00	15	15	13.00	13	13	7.00	6	8
H1	15.35	13	17	14.44	12	16	16.00	16	16	10.00	10	10	15.00	15	15	12.67	10	14
H2	16.65	12	18	16.94	15	18	17.00	17	17	16.00	16	16	16.00	16	16	17.00	15	20
H3	17.35	16	19	17.63	17	18	16.00	16	16	17.00	17	17	17.00	17	17	16.33	15	18
H4	17.75	16	20	17.50	16	20	17.00	17	17	17.00	17	17	18.00	18	18	18.33	17	20
H5	13.40	11	15	15.92	13	18	17.00	17	17	15.00	15	15				14.33	11	18
H6	19.85	17	21	19.44	17	21	18.00	18	18	18.00	18	18	18.00	18	18	18.00	17	19
H7	17.85	16	19	17.38	15	19	17.00	17	17	17.00	17	17	18.00	18	18	18.00	18	18

TABLE C10. Morphometric measurements for *H. splendidae* from each sample location.

Host sp.	*M. sp.*			*M. s. splendida*											
Location	Kangaroo Ck.			Annan R.			Bluewater Ck.			Roaring Meg Ck.			Five Mile Ck.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
Bl							339.00	100	450	170.00	170	170	220.00	220	220
BW							72.23	50	100	110.00	110	110	100.00	100	100
HL							44.73	34	60	30.00	30	30	40.00	40	40
HW							73.64	55	85	55.00	55	55	60.00	60	60
PD							22.80	18	27	15.00	15	15	22.00	22	22
DA1	1.00	1	1	2.00	2	2	2.72	2	4	1.00	1	1	2.00	2	2
DA2	10.75	9	12	12.00	12	12	11.34	7	14	11.00	11	11	12.00	12	12
DA3	10.25	10	11	12.00	12	12	11.24	10	16	10.00	10	10	12.00	12	12
DA4	12.25	11	13	15.00	15	15	13.00	10	17	14.00	14	14	14.00	14	14
DA5	3.25	2	5	3.00	3	3	4.34	2	6	5.00	5	5	4.00	4	4
DA6	4.50	3	7	5.00	5	5	7.21	5	9	7.00	7	7	7.00	7	7
VA1	1.75	1	2	2.00	2	2	2.24	1	5	2.00	2	2	2.00	2	2
VA2	20.00	17	22	20.00	20	20	21.52	20	26	20.00	20	20	23.00	21	25
VA3	18.50	17	20	20.00	20	20	19.21	15	22	22.00	22	22	21.50	20	23
VA4	22.00	20	23	25.00	25	25	22.48	20	25	24.00	24	24	25.00	23	27
VA5	5.25	4	6	5.00	5	5	5.90	4	8	6.00	6	6	6.50	5	8
VA6	10.25	8	12	10.00	10	10	10.90	10	13	9.00	9	9	12.00	10	14
DB1	13.50	8	17	15.00	15	15	12.76	10	16	15.00	15	15	12.00	12	12
DB2a	.00	0	0	.00	0	0	.00	0	0	.00	0	0			
VB1	23.00	22	25	26.00	26	26	21.90	20	24	25.00	25	25	24.50	24	25
VB2	11.75	10	13	13.00	13	13	10.93	9	14	13.00	13	13	11.50	11	12
H1	14.50	14	16	14.00	14	14	14.00	12	16	15.00	15	15	14.00	14	14
H2	16.75	16	17	17.00	17	17	15.86	14	19	16.00	16	16	19.00	19	19
H3	16.75	16	18	16.00	16	16	16.31	14	18	17.00	17	17	19.00	19	19
H4	16.75	16	18	17.00	17	17	16.97	15	19	16.00	16	16	18.00	17	19
H5	15.25	15	16	17.00	17	17	15.52	12	20	15.00	15	15	17.00	17	17
H6	19.25	18	20	19.00	19	19	17.79	14	20	18.00	18	18	19.50	19	20
H7	17.25	17	18	17.00	17	17	17.21	15	19	18.00	18	18	18.00	17	19

TABLE C11. Morphometric measurements for *R. signifieri* from each sample location

Host sp.	*P. signifer*											
Location	Corduroy Ck.			Liverpool Ck.			Mossman R.			Daintree R.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
B1				121.39	110	150	118.93	100	130	112.00	100	130
BW				65.56	50	70	65.36	35	80	56.00	50	60
HL				36.67	30	50	31.43	25	35	35.83	30	40
HW				71.11	60	90	72.67	60	90	64.17	55	80
PD				10.67	10	12	11.11	11	12	8.00	8	8
DA1	6.40	5	7	7.05	6	8	6.60	5	8	6.83	6	7
DA2	20.60	19	22	22.65	20	24	22.25	21	24	22.00	21	24
DA3	15.25	15	16	15.20	13	17	14.95	14	16	14.67	14	16
DA4	18.25	17	20	18.75	18	20	18.45	18	21	17.83	17	19
DA5	8.50	7	10	8.25	7	10	8.50	7	10	8.17	7	9
DA6	9.75	9	10	9.35	8	10	9.80	8	12	9.33	8	10
VA1	6.00	6	6	5.15	4	6	4.90	4	6	5.17	5	6
VA2	25.67	23	28	28.15	25	30	26.70	25	29	26.17	25	27
VA3	19.17	18	20	19.80	19	21	18.55	17	21	19.00	18	20
VA4	22.83	21	24	23.95	22	26	22.80	21	26	22.67	22	24
VA5	11.17	9	13	12.90	10	14	12.05	10	14	11.67	10	14
VA6	12.50	10	14	13.65	12	15	13.10	12	14	12.67	11	15
DB1	18.20	13	20	22.25	20	25	22.45	20	26	21.17	20	22
DB2	.00	0	0	.00	0	0	.00	0	0	.00	0	0
VB1	20.00	19	21	24.05	22	27	23.85	20	25	22.33	21	23
VB2	11.00	10	12	11.55	10	13	12.75	10	15	11.50	10	13
H1	13.50	13	14	12.90	10	17	14.15	12	16	15.17	14	16
H2	25.83	24	28	29.60	27	32	30.80	29	34	27.83	26	30
H3	24.20	23	25	27.10	25	30	27.85	25	31	25.50	24	27
H4	39.00	35	42	43.50	41	46	43.65	40	48	41.67	39	44
H5	14.50	13	16	15.10	13	16	15.25	14	17	15.17	15	16
H6	24.50	21	27	26.00	23	30	25.90	24	27	24.00	22	25
H7	24.83	23	26	29.20	24	31	28.80	25	32	26.83	24	30

TABLE C12. Morphometric measurements for *R. chelatus* from each sample location

Host sp.	*C. s. stercusmuscarum*																	
Location	Barron R.			Granite Ck.			Howard Ck.			Norman R.			Ross R.			Tungamull Ck.		
	Mean	Min.	Max	Mean	Min.	Max	Mean	Min.	Max	Mean	Min.	Max	Mean	Min.	Max	Mean	Min.	Max
Bl	120.56	95	150	130.00	130	130	119.50	100	140				133.33	120	140	119.09	100	140
BW	65.83	40	100	60.00	60	60	67.00	50	80				55.00	50	65	58.18	45	70
HL	35.83	30	45				31.50	20	40				43.33	35	50	31.36	25	35
HW	83.33	70	100	80.00	80	80	75.50	60	100				90.36	65	110	73.82	62	80
PD	11.63	10	16							12.00	12	12	12.80	11	17	10.18	9	11
DA1	7.51	5	9	7.33	7	8	5.55	5	7	6.86	5	8	6.30	5	7	7.24	6	8
DA2	25.21	22	28	23.33	23	24	21.60	20	23	23.26	22	25	23.00	20	25	23.24	21	25
DA3	18.64	15	21	17.67	17	18	16.55	15	18	17.39	16	19	17.65	15	19	17.04	15	19
DA4	22.64	19	24	21.33	21	22	19.80	18	21	21.13	20	23	21.60	18	24	20.76	18	23
DA5	8.72	7	10	8.00	7	9	6.90	6	8	7.87	7	9	7.75	6	9	7.80	6	9
DA6	11.67	10	13	11.33	11	12	9.75	9	11	10.22	7	12	10.75	9	12	10.80	8	13
VA1	6.62	5	8	6.00	6	6	5.35	5	6	5.39	4	7	5.50	5	7	6.08	5	8
VA2	30.90	29	34	28.00	28	28	27.55	26	30	28.83	27	31	27.75	24	31	27.36	24	30
VA3	23.36	21	26	21.00	20	22	20.45	19	22	21.61	19	23	20.60	18	23	20.04	18	22
VA4	28.10	26	30	25.67	25	27	25.00	23	28	26.43	25	28	25.25	23	28	24.40	23	26
VA5	12.56	11	14	11.33	10	12	11.60	10	13	11.04	8	13	12.10	10	14	10.72	7	12
VA6	14.74	12	16	13.33	12	15	13.80	12	15	13.57	11	15	14.40	13	15	12.76	11	15
DB1	28.41	23	32	26.67	26	27	24.50	22	28	24.70	22	27	24.50	22	28	24.24	22	26
DB2	.00	0	0	.00	0	0	.00	0	0	.00	0	0	.00	0	0	.00	0	0
VB1	31.39	28	35	28.33	28	29	28.50	26	31	29.43	27	32	27.65	25	30	27.32	25	30
VB2	14.03	12	17	13.33	13	14	13.45	12	15	14.09	12	16	13.50	12	15	12.68	11	15
H1	12.69	11	15	12.33	12	13	11.60	10	15	12.69	12	14	12.45	11	14	12.35	10	14
H2	22.44	20	25	21.33	20	22	21.40	20	23	22.36	21	24	20.60	18	23	19.96	17	23
H3	27.19	25	31	24.67	24	25	24.95	23	27	27.05	24	30	25.70	24	27	23.60	21	28
H4	38.44	35	43	35.33	34	37	35.65	32	38	38.70	34	43	37.20	35	40	35.84	33	41
H5	15.64	14	18	15.33	15	16	12.35	11	14	16.00	15	18	16.75	15	18	15.50	14	18
H6	26.23	23	30	23.67	23	25	24.30	23	26	25.86	24	28	24.65	23	28	22.68	21	25
H7	21.59	19	24	19.67	19	20	19.65	17	23	20.96	20	23	19.90	18	22	19.56	18	23

TABLE C13. Morphometric measurements for *I. mazlini* from each sample location

Host sp.	*M. eachamensis*			*M. utcheensis*									"*M. eachutchee*"								
Location	Dirran Ck.			Gwynne Ck.			Utchee Ck.			Barron R.			Nigger Ck.			Williams Ck.			Ithica R.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
B1	167.33	120	220	130.00	110	145	168.33	140	200	180.00	180	180	158.57	120	220	190.00	130	230	187.00	150	220
BW	87.33	50	140	71.67	50	85	85.00	70	130	65.00	65	65	90.71	30	150	119.00	70	150	120.00	100	140
HL	32.33	25	40	30.00	25	35	40.00	30	45	40.00	40	40	38.00	30	50	38.50	30	50	42.00	30	50
HW	84.33	60	100	85.00	70	95	92.50	80	100	100.00	100	100	92.00	80	100	98.50	80	110	97.00	90	110
PD	16.87	10	20	14.67	12	16							16.40	12	20	19.17	15	21	20.75	19	23
DA1	5.68	4	7	5.50	5	6	5.45	4	7	6.00	5	7	6.00	5	8	5.80	5	7	6.20	6	7
DA2	22.47	20	24	23.00	21	25	23.18	20	26	21.50	19	23	21.46	19	23	22.70	22	24	24.00	23	25
DA3	17.87	15	20	18.00	17	19	17.45	16	19	15.83	14	18	17.08	14	20	19.70	19	22	18.20	17	22
DA4	20.50	19	22	21.00	20	22	20.91	19	23	19.83	18	22	19.67	17	22	21.50	21	23	21.20	20	24
DA5	6.70	5	9	7.50	7	8	7.73	6	10	6.67	5	9	7.33	6	9	6.10	5	7	8.00	7	9
DA6	9.33	7	11	9.00	8	10	10.18	8	12	8.50	7	10	10.45	8	12	9.70	8	11	10.20	9	12
VA1	5.31	4	7	5.50	5	6	5.08	4	6	4.83	4	6	5.56	5	7	5.40	5	6	5.00	4	6
VA2	36.09	33	40	35.75	33	38	36.54	34	38	33.83	32	36	35.38	31	39	35.50	33	37	35.20	33	37
VA3	27.09	24	29	26.75	26	28	27.38	26	29	25.83	23	27	26.31	23	30	27.50	27	28	26.60	25	28
VA4	34.94	30	38	33.00	32	34	35.62	32	38	32.83	30	35	34.40	30	39	34.80	32	37	35.20	34	37
VA5	13.56	11	16	13.25	12	14	12.92	11	15	11.67	10	13	13.00	10	15	12.70	11	15	13.20	12	15
VA6	15.66	14	18	15.50	15	17	15.31	13	17	14.67	14	15	16.40	14	19	15.80	15	17	16.20	16	17
DB1	23.30	20	26	25.67	25	27	24.82	22	27	24.17	22	26	24.53	22	29	27.00	24	31	29.60	25	35
DB2	4.96	4	6	3.33	3	4	5.00	4	6	4.50	3	5	4.67	3	6	5.78	5	7	5.60	3	7
VB1	30.78	25	35	32.50	32	33	31.54	27	35	30.83	27	36	33.33	28	37	34.00	29	41	35.33	30	39
VB2	14.41	12	17	14.00	12	16	13.23	10	16	13.17	10	15	14.00	13	15	15.50	13	17	13.67	11	15
H1	14.09	12	15	13.25	13	14	14.08	12	15	13.50	12	15	14.38	12	17	14.70	13	16	14.40	13	15
H2	27.77	24	31	25.25	24	27	27.92	26	30	27.17	23	30	28.79	27	31	29.00	24	32	30.80	28	34
H3	32.90	28	37	29.00	24	31	31.31	27	33	32.17	30	35	32.81	30	35	34.50	31	38	33.80	32	36
H4	38.71	34	42	39.00	37	41	37.77	35	41	38.67	36	42	38.13	35	44	40.80	38	43	38.60	36	42
H5	19.44	17	23	17.75	16	20	18.23	16	21	18.33	16	21	18.60	16	21	19.20	18	21	19.00	18	21
H6	27.50	24	31	26.75	23	30	26.46	25	28	27.50	26	31	27.63	25	30	27.80	19	31	28.60	27	31
H7	21.71	20	25	22.25	21	23	22.85	20	25	23.60	22	26	22.20	20	24	23.10	21	25	24.67	24	26

TABLE C14. Morphometric measurements for *I. ornatusi* from each sample location

Host sp.	*R. ornatus*											
Location	Bible Ck.			Brunswick Ck.			Castaway Ck.			Seers Ck.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
Bl				136.00	120	150	136.75	120	150	167.65	150	180
BW				94.00	80	110	48.25	40	70	72.90	50	85
HL				27.00	25	30	36.25	25	40	53.25	40	70
HW				86.00	70	90	68.75	60	90	90.25	85	100
PD				12.58	12	18	12.65	12	15	14.30	12	17
DA1	5.46	5	6	5.48	5	6	5.38	4	7	4.91	4	6
DA2	24.58	21	28	24.84	23	27	23.46	22	26	23.91	21	27
DA3	17.92	16	20	18.28	16	21	17.37	15	19	18.88	15	21
DA4	21.85	19	25	21.88	18	24	20.88	18	23	22.32	19	25
DA5	9.04	8	11	8.24	7	10	7.92	6	10	7.24	6	9
DA6	10.23	8	12	9.60	8	12	8.88	7	11	9.06	7	11
VA1	5.31	4	7	5.16	5	6	5.17	4	6	5.03	4	6
VA2	33.54	31	38	34.56	31	37	33.46	30	37	33.38	30	37
VA3	23.73	21	26	24.72	22	26	23.38	19	26	25.50	23	28
VA4	30.62	27	33	30.20	28	33	29.08	26	32	30.50	28	34
VA5	12.88	11	16	12.52	11	14	12.92	10	14	11.06	9	13
VA6	14.46	12	16	13.32	11	16	13.67	11	16	13.71	12	15
DB1	24.19	21	28	23.04	21	26	21.67	19	24	24.59	18	29
DB2	4.31	3	6	3.12	2	5	2.79	2	5	4.47	4	5
VB1	31.46	28	35	29.96	27	33	29.37	27	32	30.74	24	35
VB2	12.23	10	15	12.08	10	14	11.13	9	14	11.53	8	14
H1	13.62	11	15	13.28	12	15	13.25	11	15	13.15	11	15
H2	24.69	22	27	23.80	21	26	23.67	22	25	28.53	22	33
H3	31.46	28	37	29.68	26	32	30.29	28	33	34.97	29	40
H4	38.31	35	42	37.44	35	40	36.92	32	40	43.24	36	47
H5	17.62	15	19	17.60	16	19	17.63	16	19	16.47	15	18
H6	27.96	26	31	26.12	24	28	26.46	22	30	31.82	27	36
H7	22.08	20	26	21.00	19	23	21.67	20	23	25.53	20	30

TABLE C15. Morphometric measurements for *I. rossi* from each sample location

Host sp.	*C. s. stercusmuscarum*																	
Location	Barron R.			Granite Ck.			Howard Ck.			Norman R.			Ross R.			Tungamull Ck.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
B1	115.50	100	130	160.00	160	160	124.50	100	160				145.71	120	180	120.91	100	150
BW	50.50	35	70	75.00	70	80	64.25	30	85				92.36	50	503	50.45	45	60
HL	40.50	35	45	40.00	40	40	36.50	30	75				45.25	35	60	38.18	35	40
HW	88.50	70	100	95.00	90	100	100.00	80	120				94.50	70	120	88.33	70	100
PD	9.75	8	12	10.00	10	10	11.00	8	12				11.90	10	14	10.13	9	11
DA1	6.13	5	7	7.00	6	8	5.35	4	7	5.00	5	5	6.05	5	7	5.81	5	8
DA2	24.40	20	26	24.67	24	25	27.25	26	28	23.00	23	23	27.45	25	30	24.96	23	28
DA3	18.20	15	21	19.67	18	21	19.30	18	20	18.00	18	18	20.70	19	22	18.38	17	20
DA4	21.20	18	24	22.67	21	24	23.50	22	25	21.00	21	21	24.90	23	26	22.08	20	25
DA5	7.53	6	10	7.00	6	8	9.00	7	11	8.00	8	8	9.10	7	11	8.19	7	10
DA6	9.73	8	12	10.67	10	11	9.75	8	12	9.00	9	9	10.85	10	13	9.81	8	12
VA1	5.20	5	6	5.33	5	6	4.75	4	5	5.00	5	5	5.00	4	6	5.50	5	7
VA2	35.27	31	39	35.33	32	37	38.65	36	41	34.00	33	35	38.10	35	42	35.54	33	39
VA3	26.80	24	29	26.33	24	28	27.65	26	30	26.50	26	27	28.45	26	31	26.04	24	28
VA4	31.93	28	35	31.33	29	33	34.30	32	38	32.00	31	33	35.55	32	39	31.88	28	38
VA5	12.40	10	15	12.67	11	14	14.40	13	15	13.00	13	13	14.25	11	17	13.27	11	16
VA6	13.73	13	15	14.67	14	15	14.35	12	16	14.00	14	14	15.95	15	18	14.15	12	16
DB1	24.86	20	30	23.00	20	26	28.65	25	31	25.00	23	27	24.40	22	27	24.62	22	28
DB2	6.57	5	9	6.00	5	7	5.55	4	7	5.00	5	5	5.90	4	7	5.58	3	8
VB1	31.00	27	41	29.33	28	30	33.55	31	37	32.00	31	33	30.80	29	33	28.92	26	33
VB2	12.00	10	15	10.33	9	11	12.25	10	14	13.00	11	15	10.85	10	13	11.12	9	13
H1	13.00	12	14	13.00	13	13	13.55	12	16	12.00	12	12	14.25	13	15	13.54	12	15
H2	24.67	22	27	25.00	24	26	29.65	27	32	26.00	25	27	27.40	25	30	25.69	21	31
H3	32.40	30	38	34.00	33	35	38.25	36	42	34.50	33	36	37.80	35	40	33.00	29	39
H4	43.20	40	51	45.67	44	47	50.65	47	56	47.50	47	48	49.90	47	53	44.50	40	50
H5	15.71	15	17	15.67	15	16	14.70	13	19	16.00	15	17	17.55	16	19	16.32	15	18
H6	28.07	23	33	29.00	28	30	33.05	30	38	26.50	25	28	33.00	30	37	28.81	25	35
H7	21.79	19	26	22.67	22	23	26.70	24	29	21.50	20	23	25.65	23	30	23.62	20	30

TABLE C16. Morphometric measurements for *I. trifasciatae* from each sample location

Host sp.	*M. sp.*			*M. trifasciata*								
Location	Kangaroo Ck.			Dulhunty R.			McIvor R.			Wenlock R.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
Bl				132.50	80	160	131.00	100	180	118.33	100	130
BW				65.00	40	80	61.10	35	110	47.33	25	60
HL				31.25	25	35	34.07	20	50	35.00	30	40
HW				83.75	80	90	83.10	60	120	68.33	65	75
PD				10.25	7	12	10.59	9	13	11.00	11	11
DA1	5.00	5	5	6.24	4	8	6.00	4	7	4.71	4	6
DA2	22.00	21	23	23.52	22	25	23.86	21	27	21.14	19	23
DA3	18.00	18	18	17.16	15	19	18.14	16	22	16.33	14	17
DA4	21.00	21	21	20.60	19	23	20.90	18	24	19.40	17	21
DA5	7.00	7	7	8.48	7	10	8.29	6	11	7.00	6	8
DA6	11.00	11	11	9.96	8	11	10.17	7	13	8.40	7	10
VA1	5.00	5	5	4.44	4	5	4.71	4	6	4.78	4	6
VA2	35.00	35	35	33.44	31	37	35.45	32	43	31.67	29	35
VA3	25.00	25	25	24.68	23	27	26.00	24	29	23.44	19	27
VA4	32.00	32	32	30.96	28	37	33.14	29	39	28.00	23	30
VA5	15.00	15	15	14.00	11	17	14.14	11	20	12.00	10	14
VA6	13.00	13	13	15.20	13	17	15.17	13	19	12.22	10	14
DB1	23.50	22	25	24.60	22	28	24.64	20	31	22.22	20	25
DB2	5.50	5	6	4.57	4	5	4.58	3	6	4.00	4	4
VB1	31.00	30	32	30.20	28	32	29.48	26	33	28.56	26	30
VB2	12.50	12	13	10.52	9	13	10.17	9	12	10.56	9	12
H1	14.00	14	14	14.28	13	16	14.69	13	16	12.44	11	15
H2	29.00	28	30	30.20	28	32	28.48	24	32	22.56	21	25
H3	35.00	35	35	35.92	33	39	34.60	30	41	29.78	26	32
H4	45.00	45	45	49.00	45	55	47.29	40	55	40.11	38	43
H5	15.50	15	16	17.08	15	19	17.45	15	20	19.22	15	20
H6	33.00	32	34	34.92	32	38	33.62	29	40	30.67	26	35
H7	27.00	27	27	29.80	28	33	26.90	23	32	21.33	20	23

TABLE C17. Morphometric measurements for *L. gracilis* from each sample location

Host sp.	*M. eachamensis*			*M. australis*														
Location	Dirran Ck.			Gwynne Ck.			Dawn Ck.			Drysdale R.			Mary R.			Pentacoste R.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
Bl	130.00	130	130	116.67	100	140				95.71	80	110				117.00	90	150
BW	30.00	30	30	41.67	35	45				35.71	20	50				45.00	25	60
HL				31.67	30	35				25.00	20	30				28.25	20	35
HW	60.00	60	60	65.00	50	80				67.86	50	80				79.75	60	100
PD				9.00	9	9				10.29	10	11				10.55	9	11
DA1	5.67	5	6	5.75	5	6	4.00	4	4	4.29	4	5	5.50	5	6	4.35	4	5
DA2	18.67	18	20	20.25	18	23	19.00	19	19	19.71	17	21	19.00	19	19	19.95	18	22
DA3	14.67	14	16	15.00	13	16	15.00	15	15	15.29	14	16	14.50	14	15	15.90	14	17
DA4	17.67	17	19	17.75	15	19	17.00	17	17	18.29	16	20	17.50	17	18	19.25	17	21
DA5	5.67	5	6	6.25	5	7	5.00	5	5	5.71	4	7	5.00	5	5	5.70	4	7
DA6	9.00	7	10	9.00	6	11	5.00	5	5	7.14	6	9	8.00	8	8	7.40	5	9
VA1	5.00	5	5	5.25	4	7	6.00	6	6	4.57	4	5	4.50	4	5	4.45	3	5
VA2	21.33	21	22	24.50	23	26	21.00	21	21	22.29	20	24	21.75	20	25	22.60	20	25
VA3	16.00	15	17	17.00	16	18	17.00	17	17	17.00	16	19	15.75	13	19	16.35	15	18
VA4	18.67	18	19	21.00	20	22	20.00	20	20	20.29	19	23	19.25	17	22	20.85	19	23
VA5	8.33	8	9	9.75	8	11	6.00	6	6	7.86	6	10	8.00	7	9	8.40	7	10
VA6	9.00	8	10	11.50	10	13	7.00	7	7	9.71	9	12	10.25	10	11	10.25	8	13
DB1	19.00	18	20	20.00	17	22	16.00	16	16	20.00	18	24	19.00	18	20	19.55	17	22
DB2	3.33	3	4	3.67	3	5	3.00	3	3	3.57	3	5	3.25	3	4	4.15	3	5
VB1	21.33	20	23	23.33	20	27	22.00	22	22	20.14	17	22	22.25	18	25	22.90	20	26
VB2	10.33	8	13	10.67	9	12	11.00	11	11	11.71	10	13	11.75	10	13	12.15	10	14
H1	12.33	12	13	11.00	10	12	11.00	11	11	12.00	10	15	11.75	11	13	11.10	9	14
H2	21.33	20	22	19.33	17	23	15.00	15	15	20.00	19	22	18.25	16	19	20.85	18	25
H3	23.67	22	25	21.50	20	24	26.00	26	26	25.57	24	27	23.75	21	25	26.10	20	30
H4	38.00	38	38	36.75	35	41	41.00	41	41	42.14	38	47	38.00	35	41	41.30	36	47
H5	14.67	14	15	15.00	14	16	14.00	14	14	13.14	10	17	14.67	14	15	14.15	12	16
H6	21.33	20	24	21.25	18	23	25.00	25	25	24.00	22	26	20.50	19	24	23.55	20	26
H7	18.33	18	19	17.25	14	23	17.00	17	17	19.57	17	22	18.75	16	20	18.00	16	21

TABLE C18. Morphometric measurements for *L. gracilis* from each sample location

Host sp.	*M. exquisita*			*M. gracilis*			*M. nigrans*						*M. duboulayi*					
Location	Moline Rockpool			Drysdale R.			Cornalie Ck.			Howard Ck.			Amamoor Ck.			Granite Ck.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
Bl				104.00	80	130	114.50	100	140	93.33	90	120				110.00	110	110
BW				44.41	25	55	52.10	33	70	46.25	25	50				45.00	40	50
HL				29.71	20	40	28.00	20	40	29.58	25	30				25.00	25	25
HW				75.88	60	90	76.00	65	90	89.58	85	90				75.00	70	80
PD				9.82	9	11				10.00	9	11						
DA1	4.67	4	5	4.24	4	5	4.20	4	5	4.42	4	5	6.00	6	6	5.00	4	6
DA2	18.67	16	20	19.82	17	22	18.30	17	20	19.17	17	22	19.00	19	19	19.50	19	20
DA3	15.00	13	16	15.65	13	18	15.10	14	17	14.75	14	17	14.00	14	14	15.00	14	16
DA4	17.67	16	19	19.18	17	21	17.80	16	19	17.25	16	19	18.00	18	18	18.25	17	20
DA5	5.33	5	6	6.12	5	7	4.50	3	6	5.50	4	8	5.00	5	5	5.75	5	6
DA6	7.67	7	9	7.71	7	9	7.80	7	9	6.92	5	9	8.00	8	8	7.75	7	9
VA1	4.67	4	5	4.06	3	5	4.20	3	6	4.17	3	5	5.00	5	5	5.00	5	5
VA2	22.33	21	24	22.41	20	25	21.40	19	23	23.00	21	26	22.00	22	22	21.75	21	23
VA3	16.33	15	17	16.59	15	19	15.80	15	18	16.42	15	18	16.00	16	16	15.25	15	16
VA4	20.00	19	21	20.94	19	23	18.90	18	20	20.00	18	22	19.00	19	19	18.50	18	20
VA5	7.33	7	8	8.41	7	10	7.90	6	9	8.67	6	11	7.00	7	7	8.50	8	9
VA6	9.33	8	10	10.00	8	12	9.90	8	13	9.17	8	11	9.00	9	9	9.50	9	10
DB1	17.67	17	18	20.24	18	24	18.60	16	20	19.17	17	22	20.00	20	20	18.33	18	19
DB2	3.00	3	3	3.53	3	4	4.50	4	5	3.92	3	5	5.00	5	5	4.67	4	5
VB1	22.33	20	25	21.47	20	26	22.20	19	25	20.92	17	23	22.00	22	22	20.67	20	22
VB2	11.33	10	13	11.94	10	13	10.90	10	12	10.75	10	12	9.00	9	9	9.67	8	11
H1	10.00	10	10	11.94	10	14	11.90	10	13	11.25	9	13	13.00	13	13	10.33	10	11
H2	18.67	17	21	20.41	17	25	19.40	16	20	18.83	16	23	21.00	21	21	16.50	16	18
H3	22.33	20	25	27.59	23	32	26.80	24	29	25.83	23	28	23.00	23	23	23.50	21	26
H4	37.33	37	38	40.82	37	45	41.90	39	43	39.92	36	44	40.00	40	40	35.00	34	37
H5	14.33	14	15	13.47	12	17	13.70	11	16	13.00	10	15	16.00	16	16	14.67	14	15
H6	21.67	21	23	25.12	22	28	24.40	23	29	22.33	20	25	23.00	23	23	19.67	18	21
H7	18.33	17	20	20.35	18	24	18.90	17	21	18.67	16	23	16.00	16	16	16.25	16	17

TABLE C19. Morphometric measurements for *L. gracilis* from each sample location

Host sp.	*M. utcheensis*			*M. sp.*			*"M. eachutchee"*		
Location	Utchee Ck.			Kangaroo Ck.			Nigger Ck.		
	Mean	Min.	Mean	Min.	Max.	Max.	Mean	Min.	Max.
Bl	130.00	110				140			
BW	59.38	50				70			
HL	29.44	25				40			
HW	76.67	70				90			
PD	10.75	10				13			
DA1	5.06	4	5.40	4	7	6	4.33	4	5
DA2	20.58	19	19.20	18	20	23	20.00	20	20
DA3	16.00	14	14.80	14	15	18	16.00	15	17
DA4	19.13	17	17.60	17	18	21	18.67	18	19
DA5	5.97	4	6.20	5	7	8	5.33	5	6
DA6	9.03	7	9.00	8	10	11	9.33	9	10
VA1	5.06	4	4.80	4	6	7	4.33	4	5
VA2	23.29	20	20.00	19	21	26	20.33	20	21
VA3	16.55	15	15.20	14	16	19	16.33	15	17
VA4	20.32	18	18.80	18	20	23	19.33	19	20
VA5	8.74	7	7.80	7	10	11	8.00	6	10
VA6	10.26	8	10.20	9	12	12	10.00	9	11
DB1	19.13	16	18.60	16	20	22	18.33	18	19
DB2	4.32	3	4.00	3	5	6	3.67	3	4
VB1	22.87	20	21.60	19	23	27	22.33	22	23
VB2	11.10	9	10.40	10	11	13	13.33	12	15
H1	11.00	10	10.33	10	11	14	12.00	12	12
H2	18.74	17	17.00	16	18	21	19.33	18	21
H3	22.68	20	21.17	20	23	26	22.33	21	25
H4	36.52	34	33.17	32	35	39	37.33	36	39
H5	14.23	11	13.83	13	15	17	14.33	14	15
H6	21.42	19	20.00	19	22	24	22.00	20	24
H7	18.39	16	15.67	15	17	20	18.67	18	20

TABLE C20. Morphometric measurements for *L. maccullochii, L. utcheei* and *L. hopevalensis* from each sample location

Parasite sp.	*L. maccullochii*						*L. utcheei*						*L. hopevalensis*					
Host sp.	*M. maccullochi*						*C. rhombosomoides*						*M. trifasciata*					
Location	Corduroy Ck.			McIvor R. 1			Utchee Ck.			Behana Ck.			McIvor R.			Wenlock R.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
B1	193.50	120	280	111.59	90	160	148.57	120	200	149.00	145	150	129.64	110	140	130.00	130	130
BW	57.50	40	100	50.36	40	70	66.21	50	85	72.00	60	80	61.07	40	80	35.00	35	35
HL	60.50	50	100	31.60	25	50	38.93	30	50	39.00	35	50	31.07	20	40	35.00	35	35
HW	86.50	70	140	61.40	50	90	70.36	55	80	67.00	60	80	62.14	50	70	65.00	65	65
PD	12.65	10	16	10.36	8	13	14.50	14	15	11.50	11	12	10.07	9	12	13.00	13	13
DA1	5.48	5	6	5.56	4	7	6.23	4	8	6.60	6	7	7.88	7	9	6.00	6	6
DA2	23.39	22	25	22.64	20	25	27.00	23	31	26.40	26	27	29.38	28	31	27.00	27	27
DA3	18.43	17	22	17.24	15	19	20.77	19	23	20.60	20	22	22.00	20	24	20.00	20	20
DA4	21.00	19	24	19.60	18	22	23.86	22	26	24.20	23	25	24.50	22	26	23.00	23	23
DA5	7.09	5	9	6.84	5	9	7.45	5	10	7.40	6	8	10.81	9	14	9.00	9	9
DA6	8.57	7	11	8.00	7	9	9.86	9	11	10.00	9	11	11.88	8	14	10.00	10	10
VA1	4.57	4	6	4.68	4	6	5.45	5	7	6.00	5	7	6.06	5	7	5.00	5	5
VA2	28.00	26	34	27.32	24	30	31.73	29	35	32.20	32	33	34.19	32	36	33.00	33	33
VA3	19.74	18	21	18.08	16	20	22.09	21	24	22.40	22	24	24.06	23	26	23.00	23	23
VA4	23.74	22	28	22.04	19	24	26.27	25	29	26.60	25	28	27.06	25	30	27.00	27	27
VA5	11.00	9	16	11.24	9	13	11.36	8	14	11.80	11	12	12.75	11	15	11.00	11	11
VA6	9.74	8	11	9.72	8	12	10.95	9	12	10.80	10	12	13.06	11	15	10.00	10	10
DB1	17.78	16	19	17.80	16	20	20.68	18	23	18.20	16	19	19.44	16	21	20.00	20	20
DB2	.00	0	0	.00	0	0	.00	0	0	.00	0	0	.00	0	0	.00	0	0
VB1	19.74	18	22	19.36	17	22	25.00	23	28	23.00	22	24	25.69	24	28	25.00	25	25
VB2	8.14	7	10	7.92	7	10	9.45	8	11	8.80	8	10	9.63	9	10	8.00	8	8
H1	12.26	11	14	11.68	10	14	12.45	11	15	12.40	12	13	14.13	12	16	13.00	13	13
H2	20.87	19	23	20.80	18	24	24.05	21	27	20.20	20	21	21.00	20	23	18.00	18	18
H3	27.30	25	30	26.04	22	30	27.50	24	32	26.40	25	27	22.81	21	25	18.00	18	18
H4	37.70	36	40	36.24	32	39	40.73	36	46	38.40	37	41	33.31	32	36	28.00	28	28
H5	14.22	13	16	13.96	12	16	15.23	14	17	15.00	14	16	16.13	15	18	14.00	14	14
H6	24.65	23	28	23.60	21	26	28.77	25	33	25.60	24	27	24.19	22	26	22.00	22	22
H7	21.52	19	26	21.64	19	25	23.09	20	26	21.40	20	23	20.19	19	22	18.00	18	18

TABLE C21. Morphometric measurements for *L. robustus* of each sample location.

Host sp.	*M. diboulgi*			*M. s. splendida*									*M. s. incrnata*									*"M. exchutchee"*		
Locat.	Granite Ck.			Annan R.			Bluewater Ck.			Liverpool Ck.			Chinaman Ck.			Howard Ck.			Wildman R.			Barron R.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min	Max.	Mean	Min.	Max.	Mean	Min.	Max.
B1	145.0	140	150				190.0	180	200	190.0	190	190	160.00	160	160	228.00	190	250	146.00	130	160			
BW	57.50	55	60				55.00	40	70	55.00	55	55	65.00	65	65	76.00	60	90	58.00	50	65			
HL	32.50	30	35				40.00	40	40	50.00	50	50	40.00	40	40	43.00	40	50	36.00	30	50			
HW	80.00	80	80				75.00	70	80	65.00	65	65	65.00	65	65	56.00	50	70	63.00	50	80			
FD	10.00	10	10				19.00	18	20	6.00	6	6	14.00	14	14				16.40	13	18			
DA1	6.75	6	8	7.67	7	8	5.00	5	5	4.00	4	4	5.00	5	5	6.00	5	7	7.67	6	10	6.33	6	7
DA2	25.00	23	27	26.67	26	27	26.00	26	26	27.00	27	27	26.00	26	26	26.80	25	28	27.17	25	29	26.33	26	27
DA3	18.60	16	21	19.33	18	20	18.50	18	19	20.00	20	20	19.00	19	19	20.40	20	21	19.00	18	21	19.33	19	20
DA4	22.00	21	23	21.67	20	23	21.00	20	22	23.00	23	23	23.00	23	23	22.80	22	24	24.33	24	25	22.67	22	24
DA5	10.60	10	12	10.00	10	10	12.00	12	12	11.00	11	11	10.00	10	10	11.80	10	14	10.83	10	12	9.33	8	10
DA6	11.60	7	14	10.67	10	11	14.00	14	14	14.00	14	14	12.00	12	12	14.20	11	16	13.00	12	14	10.33	10	11
VA1	6.60	6	9	7.00	6	8	5.50	5	6	5.00	5	5	7.00	7	7	6.00	5	7	7.33	6	8	6.00	6	6
VA2	27.60	26	29	27.00	26	28	29.50	28	31	26.00	26	26	25.00	25	25	26.80	25	28	26.33	22	28	25.67	25	26
VA3	18.20	17	19	18.33	18	19	19.50	19	20	20.00	20	20	16.00	16	16	18.40	16	20	18.17	16	20	17.00	16	18
VA4	21.20	20	22	22.00	21	23	22.50	22	23	22.00	22	22	20.00	20	20	22.20	21	23	22.67	21	25	20.67	20	21
VA5	12.00	10	14	10.67	10	11	11.50	11	12	10.00	10	10	13.00	13	13	13.80	12	15	11.33	10	13	11.00	10	12
VA6	12.60	10	14	12.00	10	14	13.50	13	14	13.00	13	13	14.00	14	14	14.20	14	15	13.83	11	16	12.67	12	13
DB1	20.60	20	21	21.00	20	23	18.00	18	18	22.00	22	22	19.00	19	19	22.00	20	23	21.60	20	22	19.67	19	20
DB2	.00	0	0	.00	0	0	.00	0	0	.00	0	0	.00	0	0	.00	0	0	.00	0	0	.00	0	0
VB1	19.20	18	20	21.00	20	22	20.00	20	20	21.00	21	21				20.60	20	21	22.00	20	24	19.67	19	20
VB2	5.00	3	6	6.00	4	7	6.00	6	6	7.00	7	7				5.60	5	6	3.75	2	5	5.00	4	6
H1	13.20	12	15	13.33	12	15	11.50	11	12	12.00	12	12	14.00	14	14	12.40	10	15	13.00	11	15	12.00	11	13
H2	19.20	18	21	17.67	17	19	20.00	20	20	20.00	20	20	19.00	19	19	20.20	19	22	19.40	17	22	17.33	17	18
H3	23.40	22	26	23.00	21	24	25.50	25	26	23.00	23	23	24.00	24	24	25.60	25	26	24.00	21	26	23.33	23	24
H4	30.60	27	32	27.33	26	28	29.00	29	29	30.00	30	30	30.00	30	30	29.20	27	31	28.80	26	32	27.33	26	28
H5	17.60	16	18	16.67	16	17	18.00	18	18	18.00	18	18	18.00	18	18	17.40	16	18	17.50	17	18	16.67	16	18
H6	25.20	22	27	23.33	22	25	22.50	22	23	26.00	26	26	25.00	25	25	24.80	24	26	22.40	19	26	21.67	21	22
H7	19.20	17	22	19.00	18	20	21.50	21	22	22.00	22	22	19.00	19	19	19.40	18	20	19.20	17	23	18.67	18	20

TABLE C22. Morphometric measurements for *I. iliocirrus* of each sample location

Host sp.	*M. dabcudgei*			*M s. splendida*									*M s. incomita*									"*M exclusivae*"		
Locat.	Granite Ck.			Annan R.			Bluewater Ck.			Liverpool Ck.			Chinaman Ck.			Howard Ck.			Wildman R.			Barron R.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
Bl	145.0	140	150				190.0	180	200	190.0	190	190	160.00	160	160	228.00	190	250	146.00	130	160			
BW	57.50	55	60				55.00	40	70	55.00	55	55	65.00	65	65	76.00	60	90	58.00	50	65			
HL	32.50	30	35				40.00	40	40	50.00	50	50	40.00	40	40	43.00	40	50	36.00	30	50			
HW	80.00	80	80				75.00	70	80	65.00	65	65	65.00	65	65	56.00	50	70	63.00	50	80			
PD	10.00	10	10				19.00	18	20	6.00	6	6	14.00	14	14				16.40	13	18			
DA1	6.75	6	8	7.67	7	8	5.00	5	5	4.00	4	4	5.00	5	5	6.00	5	7	7.67	6	10	6.33	6	7
DA2	25.00	23	27	26.67	26	27	26.00	26	26	27.00	27	27	26.00	26	26	26.80	25	28	27.17	25	29	26.33	26	27
DA3	18.60	16	21	19.33	18	20	18.50	18	19	20.00	20	20	19.00	19	19	20.40	20	21	19.00	18	21	19.33	19	20
DA4	22.00	21	23	21.67	20	23	21.00	20	22	23.00	23	23	23.00	23	23	22.80	22	24	24.33	24	25	22.67	22	24
DA5	10.60	10	12	10.00	10	10	12.00	12	12	11.00	11	11	10.00	10	10	11.80	10	14	10.83	10	12	9.33	8	10
DA6	11.60	7	14	10.67	10	11	14.00	14	14	14.00	14	14	12.00	12	12	14.20	11	16	13.00	12	14	10.33	10	11
VA1	6.60	6	9	7.00	6	8	5.50	5	6	5.00	5	5	7.00	7	7	6.00	5	7	7.33	6	8	6.00	6	6
VA2	27.60	26	29	27.00	26	28	29.50	28	31	26.00	26	26	25.00	25	25	26.80	25	28	26.33	22	28	25.67	25	26
VA3	18.20	17	19	18.33	18	19	19.50	19	20	20.00	20	20	16.00	16	16	18.40	16	20	18.17	16	20	17.00	16	18
VA4	21.20	20	22	22.00	21	23	22.50	22	23	22.00	22	22	20.00	20	20	22.20	21	23	22.67	21	25	20.67	20	21
VA5	12.00	10	14	10.67	10	11	11.50	11	12	10.00	10	10	13.00	13	13	13.80	12	15	11.33	10	13	11.00	10	12
VA6	12.60	10	14	12.00	10	14	13.50	13	14	13.00	13	13	14.00	14	14	14.20	14	15	13.83	11	16	12.67	12	13
DB1	20.60	20	21	21.00	20	23	18.00	18	18	22.00	22	22	19.00	19	19	22.00	20	23	21.60	20	22	19.67	19	20
DB2	.00	0	0	.00	0	0	.00	0	0	.00	0	0	.00	0	0	.00	0	0	.00	0	0	.00	0	0
VB1	19.20	18	20	21.00	20	22	20.00	20	20	21.00	21	21				20.60	20	21	22.00	20	24	19.67	19	20
VB2	5.00	3	6	6.00	4	7	6.00	6	6	7.00	7	7				5.60	5	6	3.75	2	5	5.00	4	6
H1	13.20	12	15	13.33	12	15	11.50	11	12	12.00	12	12	14.00	14	14	12.40	10	15	13.00	11	15	12.00	11	13
H2	19.20	18	21	17.67	17	19	20.00	20	20	20.00	20	20	19.00	19	19	20.20	19	22	19.40	17	22	17.33	17	18
H3	23.40	22	26	23.00	21	24	25.50	25	26	23.00	23	23	24.00	24	24	25.60	25	26	24.00	21	26	23.33	23	24
H4	30.60	27	32	27.33	26	28	29.00	29	29	30.00	30	30	30.00	30	30	29.20	27	31	28.80	26	32	27.33	26	28
H5	17.60	16	18	16.67	16	17	18.00	18	18	18.00	18	18	18.00	18	18	17.40	16	18	17.50	17	18	16.67	16	18
H6	25.20	22	27	23.33	22	25	22.50	22	23	26.00	26	26	25.00	25	25	24.80	24	26	22.40	19	26	21.67	21	22
H7	19.20	17	22	19.00	18	20	21.50	21	22	22.00	22	22	19.00	19	19	19.40	18	20	19.20	17	23	18.67	18	20

TABLE C23. Morphometric measurements for *I. iliocirrus* of each sample location

Host sp.	*M. exquisita*			*M. gracilis*									*"M. eachuichee"*					
Location	**Moline Rockpool**			**Drysdale R.**			**Russ Ck.**			**Barron R.**			**Nigger Ck.**			**Ithica R.**		
	Mean	**Min.**	**Max.**	**Mean**	**Min.**	**Max.**	**Mean**	**Min.**	**Max.**	**Mean**	**Min.**	**Max.**	**Mean**	**Min.**	**Max.**	**Mean**	**Min.**	**Max.**
Bl	99.76	85	120	117.75	75	150	120.00	120	120				140.00	140	140	122.36	100	170
BW	49.76	25	65	60.75	45	80	60.00	60	60				70.00	70	70	71.53	45	120
HL	29.38	25	42	34.25	20	45	35.00	35	35				30.00	30	30	40.28	30	50
HW	79.76	50	100	79.50	60	100	60.00	60	60				100.00	100	100	91.11	70	110
PD	9.81	8	11	10.20	9	12	11.00	11	11							11.50	9	14
DA1	5.96	5	7	5.50	4	7	5.28	4	7	5.83	4	7	7.00	6	8	6.39	5	8
DA2	22.67	20	25	23.45	22	25	23.34	20	26	23.73	21	26	23.00	22	24	24.92	22	27
DA3	17.33	15	20	16.90	15	18	16.59	15	19	17.57	15	20	15.33	15	16	17.06	15	19
DA4	20.54	19	23	21.00	20	22	20.17	18	23	21.04	18	24	18.33	18	19	21.28	18	24
DA5	7.50	6	9	7.75	7	9	7.90	6	9	7.73	6	10	9.33	9	10	8.97	8	12
DA6	9.42	7	11	9.10	8	10	9.59	6	11	9.55	8	11	10.67	10	11	9.97	8	12
VA1	5.08	4	6	4.80	4	6	4.90	4	6	5.00	4	6	5.00	4	6	5.14	4	6
VA2	34.04	30	36	32.05	29	35	33.52	30	37	34.36	29	40	32.33	32	33	36.56	32	41
VA3	25.54	22	28	24.50	23	27	24.41	22	28	25.14	22	29	25.00	23	27	26.14	22	29
VA4	31.38	28	33	31.05	29	33	30.41	26	34	31.46	28	36	30.00	29	31	33.94	28	37
VA5	11.50	10	14	11.90	10	14	13.55	12	15	13.39	10	17	10.33	9	11	14.97	11	18
VA6	13.67	11	16	14.15	12	16	13.93	12	16	14.68	12	18	13.33	13	14	15.22	12	18
DB1	24.33	22	27	24.40	22	26	23.93	22	27	25.64	14	33	25.33	24	27	29.19	23	37
DB2	4.29	3	6	3.35	3	4	4.48	3	6	4.30	3	6	4.67	4	5	5.06	2	7
VB1	30.13	28	33	28.85	27	33	29.07	24	35	32.11	27	36	33.33	31	35	33.72	28	40
VB2	11.71	10	14	12.65	10	15	12.41	9	16	12.32	11	14	11.00	10	12	11.25	10	14
H1	12.17	11	14	12.85	11	15	14.03	13	16	14.00	11	16	14.33	14	15	13.57	12	15
H2	25.17	22	29	27.25	22	32	27.83	25	30	26.46	21	31	25.00	24	27	28.83	23	34
H3	34.08	30	37	33.85	30	41	36.41	34	40	36.61	32	42	32.00	31	33	37.36	31	44
H4	45.46	38	49	45.45	40	53	47.03	44	51	48.68	40	55	48.00	47	49	49.31	41	54
H5	14.21	12	17	13.45	12	15	16.17	15	19	17.46	15	20	18.00	17	19	17.21	15	19
H6	33.04	27	36	31.65	25	38	33.03	30	36	34.29	28	40	30.00	29	31	36.56	33	42
H7	25.21	21	28	26.25	22	30	27.83	25	30	26.68	20	31	23.00	22	24	28.06	23	33

TABLE C24. Morphometric measurements for *I. iliocirrus* of each sample location

Host sp.	*M. nigrans*									*M. australis*											
Location	Comalie Ck.			Howard Ck.			Camp Ck.			Dawn Ck.			Drysdale R.			Mary R.			Pentacoste R.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
Bl	122.64	100	160	121.30	100	170	93.33	90	100	88.75	80	100	102.27	70	150				130.75	100	160
BW	71.14	50	99	68.04	40	100	51.67	50	55	45.00	45	45	55.57	35	85				63.75	40	80
HL	32.50	30	40	31.43	25	40	26.67	25	30	27.50	25	30	28.75	20	40				34.00	25	40
HW	82.14	70	100	79.29	60	100	78.33	75	80	83.33	60	100	74.66	40	95				91.25	70	110
PD	13.71	12	16	11.45	9	12	10.00	10	10	9.25	9	10	9.48	7	11				11.10	10	13
DA1	5.71	4	7	5.35	3	7	5.04	4	6	5.55	5	6	5.48	4	7	5.21	4	6	5.00	4	6
DA2	23.00	21	25	22.30	20	25	22.59	21	25	21.83	19	24	21.66	19	25	22.17	20	24	21.40	20	24
DA3	16.64	15	18	16.70	15	19	16.56	14	18	16.18	15	19	17.02	15	19	16.67	14	19	15.60	14	18
DA4	19.79	18	21	19.48	18	21	19.89	18	22	19.00	18	22	19.68	17	22	19.96	18	22	18.80	17	21
DA5	6.50	5	7	7.48	6	9	6.63	5	8	7.27	6	8	6.07	5	8	6.54	5	9	6.80	5	8
DA6	7.93	6	9	8.30	7	12	8.52	7	10	8.45	7	10	8.39	6	11	7.79	5	11	8.40	7	11
VA1	4.57	4	6	4.78	4	6	4.89	4	6	4.94	4	6	5.09	4	6	5.21	4	6	4.85	4	6
VA2	34.71	31	37	33.65	30	36	32.26	28	36	31.69	30	36	31.16	28	35	31.83	29	35	32.20	30	35
VA3	25.64	24	28	24.74	23	27	24.37	20	28	24.44	23	28	24.66	22	27	23.83	20	27	23.75	22	26
VA4	31.43	29	35	30.74	28	35	30.15	25	34	30.00	29	33	29.98	26	34	29.92	26	33	30.50	28	33
VA5	11.00	9	12	12.91	11	15	11.96	10	14	11.19	9	13	10.70	8	13	12.00	10	14	12.20	10	14
VA6	12.71	11	15	13.61	12	17	13.70	12	15	14.50	13	16	14.25	12	17	13.83	12	16	14.10	12	16
DB1	27.21	25	29	24.35	22	28	24.22	21	28	22.06	18	25	23.50	20	27	23.50	21	27	23.55	20	26
DB2	5.29	5	6	4.39	3	6	4.41	3	5	4.56	4	6	3.52	3	5	4.50	3	6	4.50	3	6
VB1	31.21	29	35	30.96	27	35	28.93	26	32	28.19	26	31	27.77	23	32	28.33	25	32	28.55	25	31
VB2	11.71	10	13	12.70	11	14	11.89	10	13	11.56	10	13	11.75	10	14	12.29	10	14	11.90	10	14
H1	12.36	11	15	13.17	11	15	13.37	12	16	13.19	11	15	11.89	10	15	13.71	13	15	12.80	11	15
H2	25.86	24	29	27.39	25	32	25.96	23	29	25.06	21	29	24.82	22	31	25.25	22	27	26.50	22	29
H3	36.43	34	40	34.87	31	38	35.33	23	41	32.81	30	36	33.09	30	41	33.96	31	36	33.65	30	37
H4	47.71	44	53	47.65	40	52	46.89	40	52	44.94	41	48	46.23	40	55	46.21	43	52	48.15	43	55
H5	13.29	12	16	14.87	11	18	15.48	13	18	15.73	13	18	13.45	10	17	15.67	15	17	12.60	11	14
H6	34.07	33	37	33.43	29	37	31.74	29	34	30.19	27	33	31.05	28	35	30.96	29	33	32.60	30	37
H7	27.79	25	31	27.17	25	32	25.85	23	28	24.44	20	28	23.61	21	28	24.75	22	27	24.20	20	27

TABLE C25. Morphometric measurements for *I. iliocirrus* of each sample location

	I. iliocirrus																				
Host sp.	*M. s. splendida*																				
Location	Annan R.			Bluewater Ck.			Corduroy Ck.			Lexilip Ck.			Liverpool Ck.			Mcivor R.			Five Mile Ck.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
B1				123.75	100	210							131.25	110	170	138.00	120	150	122.50	100	140
BW				67.32	50	80							69.58	50	90	80.00	70	90	57.78	50	70
HL				43.46	40	62							34.79	30	45	34.00	30	40	34.29	30	40
HW				76.43	70	100							91.36	70	110	94.00	90	100	92.78	80	105
PD				12.00	11	14							12.62	11	16	11.60	11	12	10.50	10	11
DA1	5.91	5	7	5.64	5	7	6.50	6	8	6.71	6	8	5.62	4	7	6.00	5	7	6.10	5	8
DA2	24.87	22	29	21.93	20	24	21.89	20	24	25.93	25	28	24.42	21	27	24.80	24	26	22.50	21	24
DA3	17.96	15	21	16.96	15	19	16.00	14	18	18.14	17	20	17.58	15	21	19.40	19	20	17.30	16	18
DA4	21.22	19	24	19.68	18	22	18.38	17	21	22.07	21	25	21.00	18	25	22.40	21	23	20.10	19	21
DA5	8.87	6	12	7.07	6	9	7.50	6	9	9.71	9	12	8.35	6	10	7.60	7	8	7.10	5	9
DA6	9.96	9	12	9.32	8	11	9.13	8	10	10.21	9	11	9.65	8	11	9.40	8	10	9.40	7	11
VA1	5.13	4	6	4.86	4	6	5.09	4	6	5.21	5	6	4.69	4	6	4.80	4	6	5.10	4	8
VA2	36.52	32	40	31.54	29	36	30.18	27	33	36.79	34	39	34.96	32	38	36.00	34	38	31.90	30	36
VA3	25.61	22	28	24.25	22	27	22.91	19	26	25.79	24	27	26.00	24	28	26.20	25	27	24.60	23	26
VA4	32.87	28	37	30.39	28	35	28.09	24	32	34.29	32	36	32.46	30	37	34.20	33	35	30.10	29	32
VA5	15.13	12	19	11.68	10	16	10.73	9	14	15.86	14	18	12.77	11	16	13.80	11	15	11.30	10	14
VA6	14.70	12	17	14.04	11	16	12.36	11	14	15.43	13	17	14.46	12	16	14.60	13	16	13.30	11	15
DB1	27.43	20	34	21.71	20	24	23.27	19	26	28.71	24	32	27.96	25	31	26.40	24	28	24.50	22	27
DB2	4.65	3	7	4.11	3	5	4.27	3	5	3.71	3	5	4.77	4	6	4.20	4	5	4.14	3	5
VB1	33.39	30	40	25.64	24	28	27.91	23	32	32.79	31	35	31.88	28	35	31.20	30	32	28.30	26	31
VB2	13.57	11	16	11.75	10	14	11.36	11	12	11.93	11	15	13.00	10	15	11.20	10	12	11.50	9	13
H1	14.30	12	16	14.39	13	16	13.18	12	15	15.00	14	17	13.85	12	16	14.80	14	16	13.90	13	15
H2	28.48	24	35	25.00	20	30	22.20	19	26	31.36	29	35	27.38	24	32	28.60	26	30	25.30	24	27
H3	39.30	33	45	35.64	31	40	30.82	27	35	41.21	38	43	39.08	34	43	39.60	37	42	35.30	33	38
H4	51.09	45	58	47.32	42	52	44.55	40	48	54.29	51	59	51.23	47	55	51.80	51	53	48.80	45	52
H5	16.70	15	19	17.50	16	19	16.18	15	17	19.57	18	23	14.92	12	22	16.00	15	17	16.50	16	18
H6	36.43	31	45	33.61	29	36	29.82	25	33	39.57	36	43	35.62	32	40	37.20	36	39	33.30	32	35
H7	28.83	25	34	25.00	20	28	22.73	20	25	31.64	29	36	27.69	25	31	29.80	29	31	26.10	24	29

TABLE C26. Morphometric measurements for *I. iliocirrus* of each sample location

I. iliocirrus																					
Host sp.	*M. s. splendida*												*M. sp.*			*M. s. inornata*					
Location	Roaring Meg Ck.			Ross R.			S. Mossman R.			Tungamull Ck.			Kangaroo Ck.			Dulhunty R.			Howard Ck.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
Bl	114.00	95	130	151.36	120	180							100.00	100	100				148.33	140	160
BW	59.00	40	70	68.64	40	90							50.00	50	50				68.75	40	100
HL	32.75	20	45	50.00	35	65							30.00	30	30				42.50	35	50
HW	81.00	70	100	100.33	70	130							70.00	70	70				95.00	60	120
PD	10.79	10	12	11.06	10	15							6.00	6	6				10.00	10	10
DA1	5.85	5	7	5.86	5	7	6.67	6	8	6.21	5	7	6.38	4	8	5.67	5	7	6.00	5	7
DA2	25.69	22	28	22.57	21	25	24.78	23	26	24.00	21	26	24.77	22	27	26.56	23	28	26.25	25	28
DA3	18.46	15	20	17.05	15	19	17.61	16	19	17.21	15	19	17.65	15	19	20.00	17	22	19.42	18	21
DA4	22.50	19	25	20.10	18	22	21.06	19	22	20.68	18	23	20.73	18	22	23.78	20	26	23.00	21	24
DA5	8.73	7	11	7.38	6	9	8.89	8	11	8.89	7	11	7.54	5	10	8.56	7	10	9.00	7	11
DA6	10.04	9	12	10.14	9	11	9.83	8	12	9.95	8	11	9.42	7	12	9.56	8	11	10.75	9	12
VA1	5.04	4	7	4.90	4	6	5.22	4	7	5.26	4	7	5.08	5	6	4.89	4	5	5.00	4	6
VA2	35.31	30	39	33.62	31	36	35.28	34	37	35.11	33	38	35.42	32	37	34.44	33	35	38.42	36	40
VA3	25.85	24	28	26.19	24	34	25.89	24	28	25.16	23	27	26.27	23	28	24.89	22	27	27.50	26	30
VA4	32.27	29	35	31.90	21	35	32.39	30	35	32.05	30	35	32.58	30	35	31.56	29	34	35.92	34	37
VA5	13.58	10	17	13.10	11	16	12.83	11	14	14.16	11	17	13.00	11	15	14.44	10	17	15.83	14	18
VA6	13.54	11	15	14.76	13	16	14.11	11	15	14.05	12	16	14.23	11	17	13.22	11	16	15.67	14	17
DB1	27.00	23	32	23.33	20	26	25.83	23	28	26.17	23	30	24.96	22	28	26.44	24	30	31.75	30	35
DB2	5.19	4	7	3.81	3	5	4.78	4	6	4.06	3	5	4.88	4	6	5.00	4	6	5.08	5	6
VB1	30.50	28	35	27.67	25	31	30.94	28	35	30.16	28	33	31.12	28	35	31.44	29	34	36.58	34	40
VB2	11.77	10	14	11.86	10	14	11.83	10	13	12.16	10	14	11.92	10	14	13.56	12	15	13.42	11	15
H1	14.04	12	16	13.71	12	16	14.19	12	16	13.65	12	15	14.15	13	15	14.33	13	16	14.58	12	16
H2	28.08	23	33	26.62	23	28	29.06	27	31	26.58	24	30	27.42	24	31	32.44	29	36	31.25	28	35
H3	37.42	33	42	37.05	33	41	38.50	35	41	36.53	33	42	37.04	33	42	43.33	38	47	41.83	40	44
H4	50.12	45	57	50.05	45	55	51.44	48	54	49.06	44	53	48.35	44	54	55.11	50	59	55.83	53	60
H5	15.77	12	21	17.29	15	20	17.14	16	19	17.18	16	19	16.27	15	18	18.56	17	21	17.75	16	20
H6	35.62	30	42	34.33	30	38	36.61	34	39	34.44	28	39	35.04	31	39	41.56	37	46	40.58	38	44
H7	27.65	21	33	26.05	21	31	28.78	27	30	26.42	24	30	27.65	23	32	31.22	25	35	31.92	29	34

TABLE C27. Morphometric measurements for *I. iliocirrus* of each sample location

	I. iliocirrus																	
Host sp.	*M. s. inornata*															*C. rhombosomoides*		
Location	Manton Ck.			Oscar Ck.			Robinson R.			Wenlock R.			Wildman R.			Behana Ck.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
Bl	150.25	110	180	136.32	110	170	147.75	120	170	112.50	100	130	109.77	90	140	146.67	120	170
BW	75.00	20	100	49.47	40	60	67.00	50	90	50.54	30	75	53.37	30	70	74.29	60	100
HL	43.25	35	70	38.82	30	45	39.75	30	60	39.82	35	50	33.84	20	60	40.00	30	50
HW	100.25	80	130	94.44	70	110	99.50	70	120	85.36	70	100	89.53	55	110	90.00	70	110
PD	11.55	10	13	10.60	10	12	11.88	10	13	10.17	9	12	10.41	8	13	12.67	12	13
DA1	5.80	5	7	6.18	5	8	5.80	5	7	5.69	5	7	6.51	5	8	7.00	6	8
DA2	27.20	25	29	24.67	22	29	26.45	25	28	23.20	21	25	25.07	22	28	23.60	21	25
DA3	20.05	18	23	17.82	17	20	18.35	16	21	16.96	16	20	18.12	16	21	18.20	17	19
DA4	24.90	23	28	21.12	19	24	23.10	21	25	20.20	18	23	21.95	20	25	21.30	19	23
DA5	9.75	8	11	8.67	7	10	9.25	7	11	7.60	6	9	8.63	6	10	7.10	6	9
DA6	10.80	9	13	10.06	8	12	10.60	9	13	9.33	7	12	10.86	8	13	10.30	9	11
VA1	4.85	4	5	5.24	4	7	4.90	4	5	5.02	4	6	5.21	4	7	4.90	4	6
VA2	39.65	37	41	35.82	32	39	38.45	36	41	34.93	30	40	37.88	33	41	35.60	32	38
VA3	27.50	26	29	25.36	24	28	27.05	25	29	24.84	22	28	26.88	25	29	27.00	24	29
VA4	36.10	34	38	32.70	30	36	35.05	33	37	31.31	28	35	34.16	29	37	32.30	30	35
VA5	16.75	15	18	14.64	12	20	15.75	14	18	14.31	11	18	14.93	12	18	13.70	12	18
VA6	15.90	14	18	14.70	11	18	14.75	14	16	14.20	11	17	14.81	13	17	14.60	12	16
DB1	31.20	29	34	27.18	24	31	30.90	28	35	26.60	23	32	27.67	23	33	26.80	23	30
DB2	4.85	4	6	4.82	4	6	4.95	4	6	4.98	4	7	4.44	3	5	4.38	4	5
VB1	35.40	32	38	31.91	28	35	34.90	32	39	31.73	28	35	32.88	30	38	28.90	26	30
VB2	13.20	10	16	13.21	11	17	13.00	11	15	12.67	10	15	12.98	11	15	12.70	11	14
H1	15.50	13	17	14.21	13	16	14.70	13	16	13.98	12	15	14.26	13	16	14.10	13	16
H2	32.10	28	35	28.58	25	32	30.75	28	34	28.38	24	34	27.44	23	31	25.20	20	28
H3	41.15	38	44	39.15	36	44	41.60	38	45	38.16	34	44	38.26	35	42	35.20	31	41
H4	54.20	50	58	51.06	46	56	54.90	50	58	49.82	44	57	51.26	45	57	46.40	41	53
H5	17.35	15	19	17.36	16	19	17.10	15	19	17.20	14	20	16.67	15	19	16.89	15	18
H6	40.70	38	43	36.79	30	41	40.55	37	45	35.29	31	40	36.42	33	41	31.10	27	35
H7	31.80	28	35	28.48	24	33	30.55	27	34	27.76	25	33	27.81	25	31	25.20	23	29

TABLE C28. Morphometric measurements for *I. iliocirrus* of each sample location

	I. iliocirrus																				
Host sp.	*M. duboulayi*															*M. trifasciata*					
Location	Ammamoor Ck.			Beerburrum Ck.			Granite Ck.			Tuan Ck.			Dulhunty R.			Moline Rockpool			Wenlock R.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
Bl	140.00	110	170	130.00	130	130	139.00	120	150	110.33	90	140	136.67	130	140	85.00	75	90	83.33	80	100
BW	69.62	60	95	60.00	60	60	57.50	45	70	46.33	30	80	68.33	65	70	51.67	40	70	40.42	40	45
HL	34.17	25	50	30.00	30	30	31.43	25	40	29.83	20	40	31.67	30	35	26.67	25	30	25.83	25	35
HW	96.54	90	110	90.00	90	90	103.50	90	120	89.83	60	140	100.00	90	110	71.67	60	85	86.25	65	90
PD	10.00	9	11	11.00	11	11	11.00	10	12	10.00	8	13	11.00	11	11	11.00	10	12	9.42	7	11
DA1	5.85	5	7	6.17	6	7	5.87	4	7	5.47	4	6	5.33	4	7	6.00	5	7	5.12	5	6
DA2	25.69	23	27	24.67	24	26	24.09	21	27	24.47	22	26	27.29	25	29	20.67	20	21	23.65	21	26
DA3	19.15	17	20	18.17	17	19	17.18	14	19	17.33	15	20	19.75	16	22	15.00	14	16	17.94	15	21
DA4	23.31	20	25	21.33	20	23	21.00	18	23	21.07	18	24	23.38	22	25	17.67	17	18	21.06	18	24
DA5	9.08	7	11	8.67	8	10	8.32	6	10	8.17	7	10	8.75	8	10	6.00	5	7	8.06	7	9
DA6	10.00	9	11	10.00	9	11	9.86	8	12	9.60	8	12	9.54	8	12	7.67	7	8	9.00	8	10
VA1	5.15	4	6	4.57	4	5	5.17	4	6	5.10	4	6	4.71	3	7	5.33	5	6	4.88	4	6
VA2	36.38	31	40	34.29	32	36	34.33	30	40	34.67	32	38	34.04	30	37	30.67	30	32	31.35	28	36
VA3	26.77	24	29	25.00	22	29	24.21	21	27	25.40	22	28	24.17	22	26	22.00	20	24	23.47	19	27
VA4	34.38	30	38	31.71	28	35	31.83	27	37	31.83	28	35	30.25	28	34	27.33	25	29	28.24	23	33
VA5	13.23	11	16	13.29	11	15	14.17	11	17	13.37	10	16	12.25	10	15	11.67	10	14	11.24	8	14
VA6	14.54	12	16	14.71	13	17	14.25	11	16	15.17	14	17	12.67	10	15	13.33	12	14	11.76	10	15
DB1	28.92	27	30	25.29	22	27	27.71	23	34	26.03	23	32	25.75	22	29	22.67	21	25	23.76	22	28
DB2	4.54	4	5	4.71	4	5	4.79	3	6	3.97	3	6	4.96	4	6	5.00	4	6	5.06	4	6
VB1	32.85	30	35	31.43	30	34	31.42	29	35	32.60	30	35	30.67	25	35	28.00	26	30	29.29	26	32
VB2	12.85	12	15	11.86	11	13	11.33	9	13	12.77	11	15	12.63	11	15	11.67	11	12	12.29	9	15
H1	14.54	13	15	14.14	13	15	14.08	13	16	14.10	13	16	13.75	12	17	12.67	12	13	12.94	12	14
H2	28.46	25	31	25.43	24	27	27.92	24	33	27.27	25	31	32.46	30	35	22.67	22	24	25.65	23	29
H3	40.00	34	42	35.71	31	39	38.54	34	42	36.87	30	42	44.08	40	47	29.33	28	32	34.35	28	40
H4	49.31	41	55	46.43	44	49	49.75	44	55	48.07	40	55	54.79	51	58	41.67	40	43	47.06	43	50
H5	16.77	16	18	18.29	17	19	17.92	16	21	16.37	15	18	16.50	15	19	16.33	16	17	14.82	13	17
H6	37.77	30	41	33.71	29	35	35.75	29	40	36.43	30	40	41.38	38	44	28.33	27	30	31.06	26	36
H7	29.85	27	32	25.86	24	27	28.17	22	32	28.57	24	32	32.13	29	35	21.67	20	23	23.65	20	29

TABLE C29. Morphometric measurements for *L. auripontiformis* of each sample location

	L. auripontiformis																				
Host sp.	*M. exquisita*			*M. gracilis*						*M. trifasciata*									*"M. eachatchee"*		
Location	Moline Rockpool			Drysdale R.			Russ Ck.			McIvor R.			Moline Rockpool			Wenlock R.			Barron R.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
B1	99.62	90	110							170.00	160	180	96.67	80	100						
BW	35.77	25	55							87.50	70	100	35.83	25	50						
HL	30.77	25	40							40.00	40	40	25.83	25	30						
HW	70.77	60	80							82.50	70	90	65.00	60	70						
PD	9.62	8	11							13.00	12	14	9.67	8	11				11.00	11	11
DA1	9.57	9	11	9.00	9	9	9.38	8	10	10.25	9	11	9.33	8	10	9.67	9	10	9.33	8	10
DA2	29.59	28	31	29.50	27	32	31.25	30	33	32.00	31	33	26.00	24	28	29.67	28	31	30.44	28	34
DA3	21.95	20	25	22.25	20	23	23.88	22	25	25.00	24	26	18.83	18	20	22.00	20	23	23.50	22	26
DA4	26.00	23	28	25.75	24	27	27.87	27	29	27.75	27	29	23.17	22	24	25.67	25	27	26.72	25	29
DA5	9.81	8	11	9.50	9	11	10.75	8	12	9.75	9	11	10.50	10	12	10.00	10	10	8.61	6	12
DA6	12.95	12	14	12.75	12	14	13.25	11	16	14.00	12	15	11.83	11	13	11.67	10	13	12.28	10	15
VA1	6.27	5	7	6.00	5	7	6.37	5	7	6.50	6	7	5.33	5	6	6.67	6	7	6.16	5	7
VA2	33.73	31	37	33.25	31	35	34.50	32	37	36.00	35	38	32.50	30	35	32.67	31	34	35.26	32	38
VA3	21.77	19	24	22.00	21	23	21.25	20	24	23.00	22	25	22.00	21	23	21.00	20	22	22.79	20	26
VA4	26.59	25	30	27.25	27	28	26.25	24	28	27.75	27	29	25.50	24	27	26.00	24	27	27.63	26	30
VA5	13.41	11	16	14.00	12	15	14.25	13	16	14.25	14	15	12.33	11	14	12.67	11	14	13.74	10	16
VA6	11.23	10	13	11.50	11	12	11.38	10	14	12.00	10	13	11.17	11	12	10.33	10	11	11.79	9	14
DB1	19.95	18	22	19.75	18	22	20.12	18	22	22.25	21	23	19.50	18	22	21.00	20	23	20.67	18	24
VB1	23.67	22	28	24.75	24	25	24.63	24	26	26.00	25	28	22.83	21	25	26.33	25	27	25.41	23	30
VB2	9.57	8	12	11.00	10	12	10.75	10	12	9.00	8	11	9.00	9	9	10.00	9	11	9.29	7	12
H1	11.35	10	13	13.75	13	15	13.00	12	15	13.25	13	14	11.33	10	13	12.67	12	13	12.41	11	14
H2	21.52	18	25	21.50	20	22	23.25	21	25	24.75	24	25	20.33	19	22	20.33	19	21	21.72	19	25
H3	24.29	21	30	24.00	21	25	24.50	23	28	25.50	25	26	21.00	20	23	23.00	22	24	23.67	22	26
H4	38.41	36	41	37.25	35	39	38.88	36	44	46.00	42	48	31.00	30	32	38.67	37	41	39.94	32	45
H5	13.85	11	17	14.50	14	15	14.25	13	15	16.25	16	17	12.33	11	13	15.00	14	16	15.81	15	17
H6	24.10	21	28	23.50	22	25	25.38	24	27	24.25	23	25	20.33	19	22	21.67	20	23	22.79	20	26
H7	22.05	20	25	22.00	20	25	22.88	22	25	23.25	21	26	18.83	18	20	21.00	21	21	21.84	19	25

TABLE C30. Morphometric measurements for *L. auripontiformis* of each sample location

	L. auripontiformis																				
Host sp.	*M. nigrans*												*M. australis*								
Location	Comalie Ck.			Howard Ck.			Camp Ck.			Dawn Ck.			Drysdale R.			Mary R.			Pentacoste R.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
B1	139.50	115	165	113.33	100	140	90.00	90	90				116.56	100	150				121.75	100	150
BW	59.00	50	70	43.33	35	50	40.00	40	40				49.06	35	60				46.75	30	60
HL	35.00	30	60	31.67	30	35	35.00	35	35				31.56	20	45				33.50	25	45
HW	71.50	50	90	81.67	65	90	60.00	60	60				64.38	50	90				73.75	60	90
PD				9.50	9	10													9.41	8	12
DA1	7.60	7	8	8.82	8	11	9.33	8	10	9.50	9	10	8.85	8	10	9.00	8	10	7.75	6	9
DA2	28.60	27	30	27.24	25	30	27.67	26	29	26.50	26	27	28.50	26	31	28.90	26	31	27.90	25	31
DA3	21.70	21	22	20.29	19	23	20.33	20	21	21.00	21	21	21.35	19	24	22.20	20	24	21.35	19	24
DA4	24.90	24	26	23.82	21	26	24.00	24	24	23.50	23	24	24.30	22	26	25.20	22	27	24.40	21	27
DA5	8.10	7	9	8.94	7	11	9.33	8	11	8.50	8	9	8.50	7	10	9.10	7	12	9.30	7	11
DA6	11.90	10	14	11.12	10	13	11.33	11	12	12.50	12	13	12.15	10	13	11.80	9	15	11.55	10	13
VA1	5.80	5	7	6.00	5	7	6.67	6	7	6.50	6	7	6.10	5	7	6.22	5	7	5.10	5	6
VA2	30.70	26	33	30.71	28	33	31.67	31	32	29.50	28	31	31.95	30	34	32.38	30	34	32.30	29	36
VA3	20.30	18	24	19.94	18	22	20.67	20	21	20.00	19	21	21.80	19	24	21.13	19	23	20.80	18	23
VA4	24.40	22	28	24.18	21	27	24.67	24	26	23.50	21	26	25.65	24	27	25.13	21	27	25.35	22	29
VA5	11.70	10	13	12.24	11	15	12.33	11	13	11.50	11	12	12.60	11	14	12.88	12	15	12.55	11	14
VA6	11.00	10	12	11.00	9	12	12.00	11	13	11.00	11	11	12.40	10	14	11.12	9	12	10.95	10	12
DB1	19.50	18	22	19.06	16	22	18.67	18	20	18.50	18	19	18.90	15	22	19.40	18	20	19.50	17	23
VB1	22.50	20	24	21.71	20	26	23.33	19	27	22.50	22	23	21.55	20	23	23.70	22	27	23.20	20	26
VB2	9.20	8	10	8.65	7	11	10.33	10	11	10.00	10	10	9.75	9	10	9.90	8	11	9.65	7	12
H1	11.20	10	13	11.76	9	14	12.00	12	12	12.00	12	12	10.60	10	12	12.70	10	14	11.95	10	14
H2	19.40	17	23	19.65	17	23	21.33	19	23	19.00	18	20	21.05	18	25	21.78	20	24	21.45	18	25
H3	23.60	22	27	20.71	17	24	22.67	20	25	21.50	21	22	21.70	20	25	23.70	22	25	22.45	19	26
H4	35.80	33	38	33.47	30	38	38.00	35	40	35.50	35	36	41.05	35	46	37.89	34	42	38.25	30	45
H5	11.60	10	12	13.76	11	16	13.67	13	14	15.00	15	15	12.60	10	16	14.50	11	17	12.45	10	15
H6	22.50	21	25	21.24	19	25	20.67	20	21	20.50	20	21	21.80	20	24	22.38	21	25	22.75	19	26
H7	20.40	19	22	19.76	17	22	21.67	20	24	20.50	20	21	20.70	19	22	21.80	20	25	21.35	20	23

TABLE C31. Morphometric measurements for *L.* auripontiformis of each sample location

	L. auripontiformis																							
Host sp.	*M. duboulayi*												*M. sp.*						*M. s. splendida*					
Location	Ammamoor Ck.			Beerburrum Ck.			Granite Ck.			Tuan Ck.			Kangaroo Ck.			Ross R.			S. Mossman R.			Tungamull Ck.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
B1	165.00	140	200				141.67	125	160	107.74	80	130				148.57	130	160						
BW	50.63	30	65				45.00	40	50	38.55	20	60				57.50	40	70						
HL	36.25	30	50				31.67	30	35	31.77	20	80				46.25	30	50						
HW	76.87	60	100				79.29	60	85	75.00	50	90				80.00	60	100						
PD	10.25	9	11				10.00	10	10	9.71	8	13				10.80	9	14						
DA1	9.00	8	10	9.29	8	10	9.00	6	11	8.55	7	10	8.90	8	10	9.18	8	10	10.06	9	11	9.82	9	12
DA2	31.50	30	33	30.79	28	33	29.70	27	34	31.16	29	33	30.24	28	33	29.55	27	32	31.88	29	35	31.27	28	34
DA3	24.60	23	26	22.86	21	25	22.60	19	27	23.74	22	25	23.24	22	25	23.00	20	24	24.35	22	27	22.91	22	26
DA4	27.80	26	29	26.71	25	28	26.00	21	30	27.00	25	29	26.52	25	28	26.27	23	29	27.65	26	30	26.36	25	29
DA5	9.90	9	11	9.86	9	11	9.95	9	12	9.71	8	12	8.95	7	11	9.36	8	11	10.35	9	13	10.18	9	12
DA6	12.70	11	14	11.93	10	13	11.65	9	14	11.87	9	15	11.38	9	14	12.64	10	14	13.18	11	15	12.55	10	14
VA1	5.90	5	7	6.00	5	7	6.05	5	7	5.94	5	7	6.67	5	8	5.55	5	7	6.24	5	8	5.82	5	7
VA2	35.70	34	39	34.36	32	36	33.75	32	36	35.52	33	40	33.67	31	37	34.64	32	38	35.00	32	38	35.18	32	38
VA3	23.50	21	26	22.57	21	24	21.30	19	25	22.84	20	24	22.86	20	25	22.45	21	24	22.94	22	26	21.91	20	24
VA4	29.50	28	34	28.07	25	31	26.35	24	30	28.03	26	30	27.38	26	30	27.64	25	30	27.94	26	31	27.45	26	30
VA5	13.70	12	16	13.36	10	16	14.20	11	16	14.06	12	16	12.71	11	14	13.36	11	16	13.47	11	16	14.73	13	17
VA6	12.40	11	14	11.57	10	13	11.75	10	15	12.65	11	15	11.62	10	14	12.82	11	14	12.12	10	15	12.45	11	14
DB1	21.20	19	24	19.79	18	21	20.70	19	26	20.03	18	23	19.67	18	22	19.27	18	22	20.41	19	22	20.55	19	23
VB1	25.20	22	28	24.36	22	26	24.15	21	28	24.13	22	26	24.48	23	27	22.55	21	24	24.53	23	26	24.64	22	28
VB2	9.70	8	11	8.64	7	10	8.95	8	10	8.71	8	11	9.86	7	12	8.82	8	10	9.35	8	12	8.64	7	11
H1	14.56	13	16	12.69	12	14	12.95	11	15	13.52	11	15	13.10	12	14	12.45	11	14	13.00	12	14	13.25	12	15
H2	24.00	22	26	22.36	21	24	24.95	22	28	22.90	20	27	23.57	21	26	22.18	21	23	22.76	20	25	24.00	20	28
H3	26.44	24	28	24.00	22	28	25.50	22	29	25.10	23	28	27.05	23	32	23.82	22	26	24.24	22	26	25.11	23	29
H4	43.70	41	49	39.64	36	45	42.30	35	47	42.29	38	48	42.10	37	46	40.18	38	42	40.65	38	45	39.18	33	44
H5	16.80	15	19	16.54	15	17	16.05	14	18	16.26	14	18	15.48	14	17	16.36	13	18	16.13	15	18	16.71	16	18
H6	28.11	25	31	24.29	22	26	25.10	23	28	25.32	21	30	23.57	21	26	23.09	16	26	23.53	22	26	23.75	22	25
H7	23.70	21	26	22.07	20	25	23.70	20	26	23.45	21	27	23.43	21	27	22.27	21	24	22.65	20	24	22.67	20	27

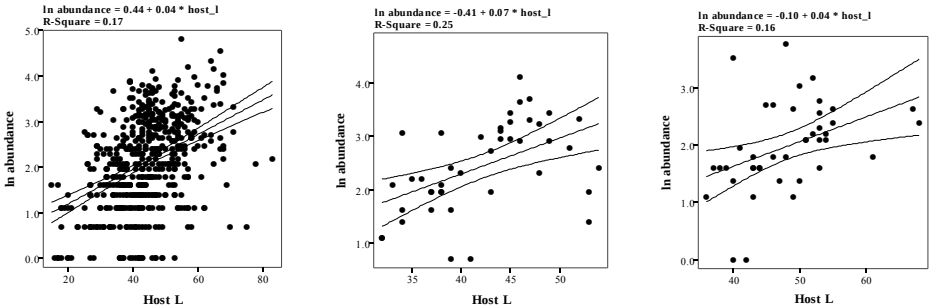
TABLE C32. Morphometric measurements for *L. auripontiformis* of each sample location

	L. auripontiformis																							
Host sp.	*M. s. inornata*																							
Location	Chinaman Ck.			Dulhunty R.			Howard Ck.			Manton Ck.			Oscar Ck.			Robinson R.			Wenlock R.			Wildman R.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
Bl	141.67	120	150				140.00	120	160	158.00	130	180	136.07	120	140	148.82	100	180	121.00	105	140	108.47	90	140
BW	54.17	50	60				63.33	60	70	56.25	45	70	39.29	30	50	55.29	40	80	36.00	30	50	38.19	25	60
HL	41.25	40	45				40.00	35	45	42.00	30	55	37.50	30	45	40.88	30	50	38.00	30	40	31.94	20	50
HW	70.00	70	70				80.00	70	90	81.75	70	110	77.86	70	85	73.82	50	95	67.00	50	80	76.67	60	100
PD	8.67	8	10				11.00	10	12	10.00	9	11	10.33	10	11	10.86	9	12	9.36	7	13	10.06	8	12
DA1	9.77	8	11	9.33	9	10	10.33	10	11	9.50	8	11	9.78	9	11	9.76	8	11	9.44	9	11	10.11	9	11
DA2	30.95	28	33	30.67	30	32	34.00	33	35	34.65	32	37	31.04	29	35	33.65	32	35	29.38	28	31	32.13	29	35
DA3	23.95	21	26	23.00	22	24	26.33	26	27	26.10	24	28	23.59	20	27	25.47	24	27	22.88	20	24	23.76	21	27
DA4	27.36	25	29	26.33	26	27	29.67	29	30	29.95	27	33	27.15	25	30	29.00	28	31	25.88	24	27	27.92	26	30
DA5	9.28	7	13	9.33	9	10	10.67	10	12	11.55	10	13	9.85	8	12	11.76	10	14	8.50	7	10	10.89	8	14
DA6	12.85	11	15	12.33	11	14	14.67	14	15	14.30	12	16	12.96	11	15	14.18	13	16	12.81	11	15	13.92	11	16
VA1	5.95	5	7	6.00	6	6	6.33	6	7	5.85	5	7	5.92	5	7	5.59	5	6	5.75	5	6	5.95	5	7
VA2	36.26	34	40	34.00	32	36	40.00	40	40	39.45	37	42	35.54	33	39	38.35	36	40	33.63	31	36	37.13	35	40
VA3	24.13	22	26	21.33	21	22	24.33	24	25	24.55	23	27	22.50	20	24	23.71	22	25	21.63	20	23	23.71	22	25
VA4	29.00	26	31	26.00	25	27	29.33	29	30	30.95	28	33	27.81	25	31	30.12	28	33	26.00	25	28	29.26	27	32
VA5	13.74	11	17	13.67	12	15	17.33	16	19	17.15	15	19	14.62	12	18	16.24	14	18	13.31	11	15	14.68	11	17
VA6	12.10	10	15	11.00	10	13	12.33	12	13	12.85	12	14	11.73	10	15	12.18	11	14	11.19	9	13	12.39	11	15
DB1	19.36	17	22	20.67	20	21	23.00	22	25	22.15	18	24	20.93	19	22	22.53	21	25	20.50	19	22	21.39	18	25
VB1	24.41	21	28	23.00	23	23	29.33	28	30	28.30	25	32	25.15	22	27	27.88	26	30	23.75	22	26	25.79	22	28
VB2	9.15	8	10	8.67	8	9	10.00	10	10	10.70	9	13	9.59	8	11	9.76	8	12	9.13	8	11	9.32	8	11
H1	13.03	11	14	13.00	12	14	13.67	13	14	13.55	12	15	13.24	12	15	13.47	11	15	12.38	11	13	13.45	12	15
H2	22.63	20	28	22.00	21	23	29.00	28	31	28.75	25	32	24.19	22	27	27.18	24	31	22.25	20	24	23.87	20	27
H3	23.97	20	27	23.67	22	25	28.33	28	29	30.75	26	34	24.79	22	27	28.76	26	32	23.00	20	26	25.24	22	30
H4	40.75	37	45	36.67	36	37	44.00	42	47	48.40	40	55	41.69	37	46	46.94	42	54	39.07	35	43	41.16	34	47
H5	16.13	14	18	16.67	16	17	17.33	17	18	15.10	13	18	15.96	15	18	16.12	15	19	15.38	14	17	16.18	15	18
H6	24.17	22	27	22.33	21	23	28.33	27	29	27.15	24	29	23.50	21	25	26.41	24	30	22.13	21	24	24.47	22	28
H7	22.64	20	27	22.33	22	23	26.67	25	28	26.65	21	30	23.35	20	26	26.00	23	30	21.44	19	24	23.79	20	27

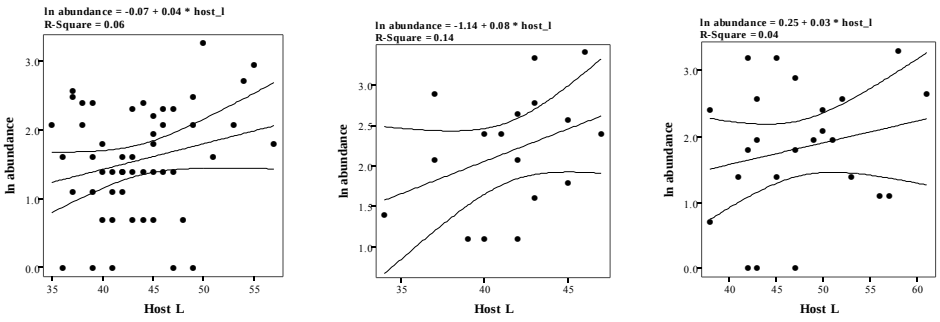
TABLE C33. Morphometric measurements for *L. auripontiformis* of each sample location

	L. auripontiformis																							
Host sp.	*M. s. splendida*																							
Location	Annan R.			Bluewater Ck.			Corduroy Ck.			Five Mile Ck.			Lezilip Ck.			Liverpool Ck.			McIvor R.			Roaring Meg Ck.		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
B1													138.00	120	150	146.00	130	170	112.86	90	130	125.00	120	130
BW				60.00	60	60							58.00	50	60	56.00	40	70	46.43	40	55	40.00	40	40
HL				50.00	50	50							40.00	40	40	41.00	35	50	35.71	25	40			
HW				95.00	95	95							63.75	60	70	86.00	70	100	68.57	60	80	60.00	60	60
PD				12.00	11	13							12.50	12	13	10.60	10	11	10.00	9	11			
DA1	9.90	9	11	9.46	8	11	9.50	9	10	10.13	9	11	9.67	9	10	10.00	9	11	9.36	8	10	10.50	10	11
DA2	32.48	30	35	30.71	28	34	30.00	29	31	32.62	30	34	31.44	30	34	33.20	32	34	32.36	30	34	31.50	29	34
DA3	24.43	22	27	23.63	21	26	23.00	23	23	24.50	22	26	23.78	22	25	26.00	25	28	24.36	20	26	23.50	23	24
DA4	28.48	26	30	26.92	24	29	26.50	26	27	27.88	27	29	27.00	25	29	29.00	28	30	26.91	23	29	27.00	27	27
DA5	10.67	8	14	9.79	8	13	10.00	9	11	11.38	10	13	9.67	9	10	10.60	9	12	8.45	7	11	9.00	9	9
DA6	12.57	10	15	12.96	10	15	12.25	10	14	13.00	11	15	12.89	11	15	13.20	12	15	13.09	12	15	13.00	12	14
VA1	6.19	5	7	5.75	5	9	6.33	6	7	6.00	5	7	5.56	5	7	6.00	6	6	5.73	5	7	6.50	6	7
VA2	36.19	33	40	34.25	31	38	32.67	31	36	37.00	35	39	35.44	33	38	38.40	38	39	35.27	33	39	33.50	33	34
VA3	22.95	20	25	22.46	20	25	21.00	19	22	23.13	22	26	23.22	21	26	23.60	23	24	24.00	22	26	22.50	22	23
VA4	28.48	26	30	28.25	27	31	26.00	24	28	28.88	28	30	29.67	29	30	29.40	29	30	28.55	27	30	26.00	26	26
VA5	14.95	12	17	13.75	11	16	14.50	13	17	15.63	14	18	14.00	12	16	16.00	15	17	14.18	12	17	14.00	14	14
VA6	12.00	10	14	12.50	10	15	9.75	9	11	12.50	11	13	13.33	11	16	11.80	10	14	13.09	12	14	12.50	12	13
DB1	20.90	18	23	19.13	16	22	18.67	17	20	21.57	20	22	21.78	20	23	22.00	20	24	20.00	18	21	19.00	19	19
VB1	26.29	23	31	22.63	20	25	23.00	20	26	26.71	25	30	25.78	22	30	25.60	25	27	25.18	23	28	22.00	22	22
VB2	9.57	8	11	8.63	7	10	9.67	9	10	9.00	8	10	9.56	8	11	8.00	7	9	9.18	8	11	9.00	9	9
H1	13.57	11	15	13.25	11	15	12.25	12	13	13.25	12	15	12.78	12	14	12.80	12	14	13.27	12	15	12.50	12	13
H2	24.76	21	30	23.00	20	27	20.67	20	21	27.13	24	30	22.78	20	27	25.20	23	26	23.55	20	27	21.00	21	21
H3	27.10	22	31	24.63	22	28	23.50	23	24	28.25	26	32	24.33	23	27	27.80	26	30	24.82	21	28	23.50	22	25
H4	42.62	36	49	40.75	36	45	37.25	35	40	45.00	42	48	40.11	38	44	45.80	45	47	39.45	35	45	38.50	37	40
H5	15.14	14	16	16.25	14	18	14.50	13	16	17.88	16	20	15.89	14	18	16.00	15	17	15.55	13	18	16.00	16	16
H6	24.38	21	28	23.33	21	26	23.50	21	28	26.00	24	28	23.78	20	26	25.00	25	25	24.91	23	27	22.50	22	23
H7	23.33	20	28	22.17	19	28	22.00	21	23	27.75	26	30	22.22	21	26	25.80	25	27	22.82	20	26	22.50	22	23

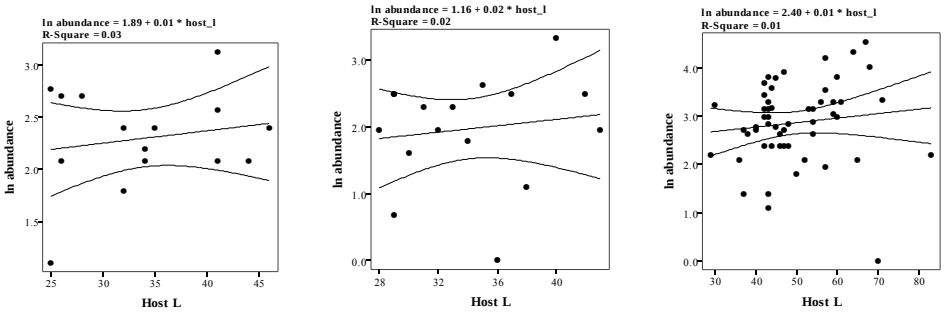
APPENDIX D CHAPTER 7 FIGURES



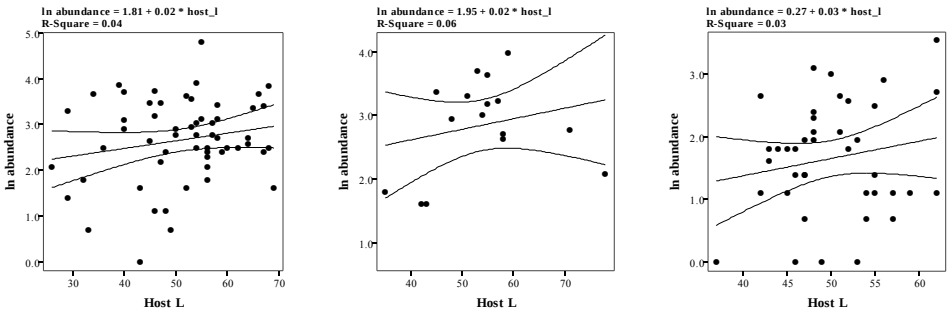
All hosts *M. australis* *M. duboulayi*



M. eachamensis *M. exquisita* *M. gracilis*



M. maccullochi *M. nigrans* *M. s. inornata*



M. s. splendida *M. trifasciata* *M. utcheensis*

FIGURE D1. Correlation between host length and parasite ln abundance.

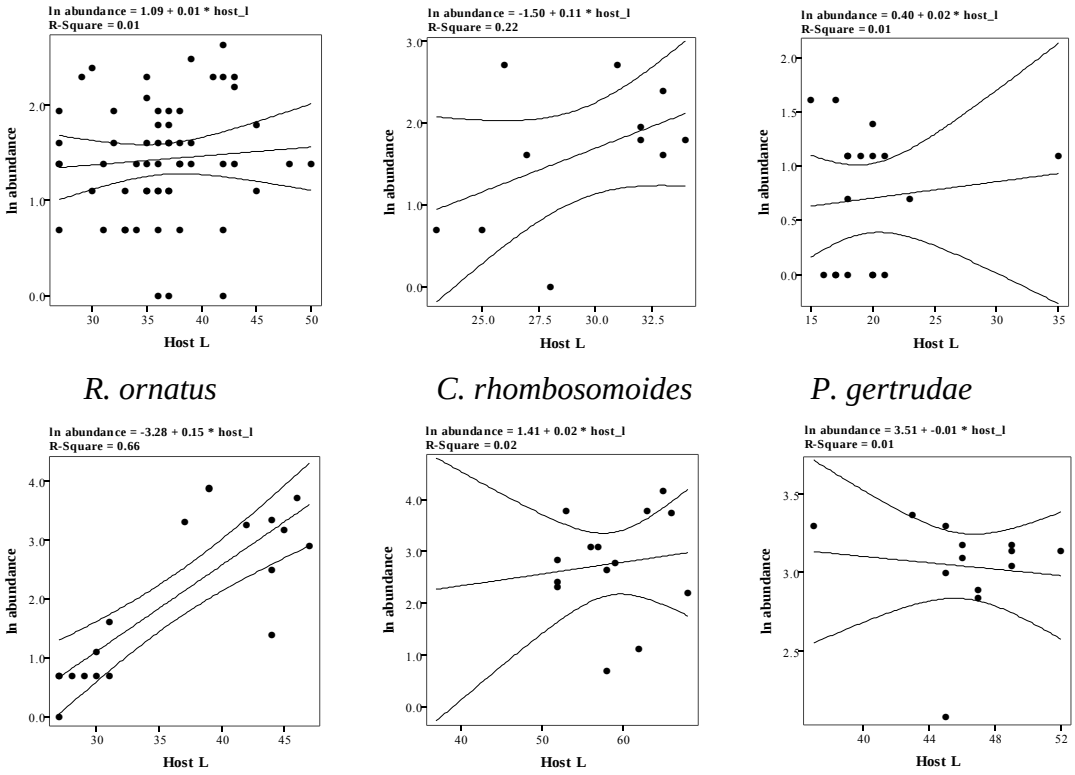


FIGURE D1 cont. Correlation between parasite ln abundance and host length.

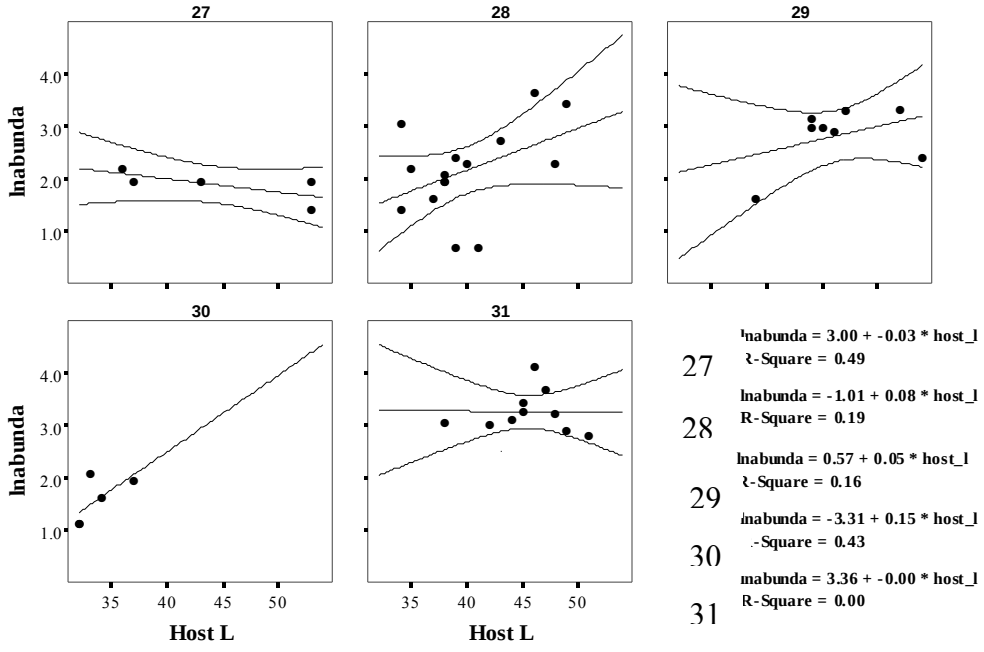
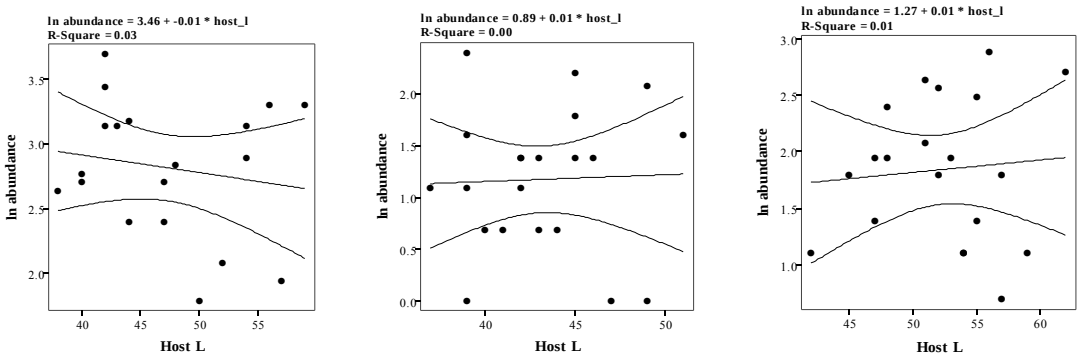


FIGURE D2. Correlation between host length and parasite ln abundance for each sample site of *M. australis*.



M. s. inornata *M. eachamensis* *M. utcheensis*

FIGURE D3. Correlation between ln abundance for all parasites and host length for *M. s. inornata* from Chinaman Ck., *M. eachamensis* from Nigger Ck. and *M. utcheensis* from Utchee Ck.

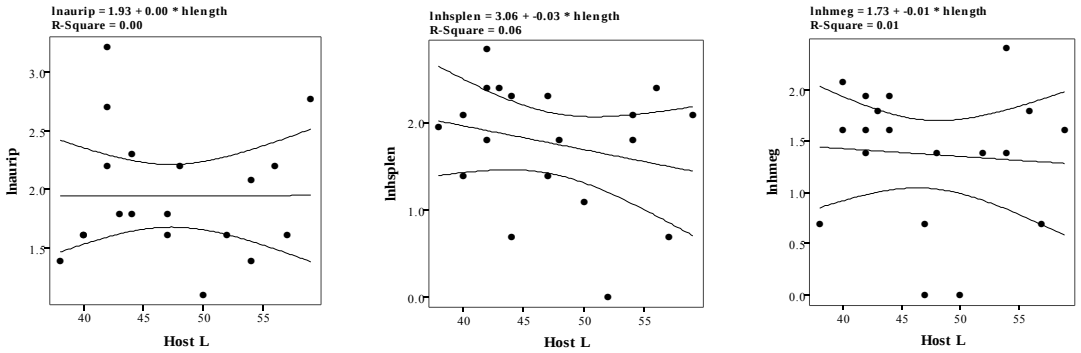


FIGURE D4. Correlation between parasite species ln abundance and host length on *M. s. inornata* from Chinaman Ck.

APPENDIX E CHAPTER 7 TABLES

TABLE E1. Mean abundance of parasite species infections on hosts at individual locations

Host species	loc IDF		*R. chelatus*	*R. signiferi*	*H. splendidae*	*H. megaloanchor*	*H. mcivori*	*H. marjoriaea*	*H. maccullochii*	*H. gertrudaea*
M. eachamensis	14	Mean	.00	.00	.63	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	2	0	0	0	0	0
	18	Mean	.00	.00	1.00	.20	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	4	2	0	0	0	0
M. exquisita	26	Mean	.00	.00	.29	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	1	0	0	0	0	0
M. gracilis	15	Mean	.00	.00	.22	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	3	0	0	0	0	0
	34	Mean	.00	.00	.00	.00	.00	.00	.00	.00
M. maccullochii	12	Mean	.00	.00	.44	.78	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	2	2	0	0	0	0
	56	Mean	.00	.00	.00	.00	.00	.00	1.67	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	0	0	0	0	4	0
M. nigrans	11	Mean	.00	.00	.00	.00	.00	.00	.00	.00
	19	Mean	.00	.00	.00	.00	.00	.00	.00	.00
M. utcheensis	40	Mean	.00	.00	3.20	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	12	0	0	0	0	0
M. australis	8	Mean	.00	.00	.93	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	2	0	0	0	0	0
	13	Mean	.00	.00	2.63	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	6	0	0	0	0	0
	15	Mean	.00	.00	.36	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	2	0	0	0	0	0
	24	Mean	.00	.00	4.10	3.50	.00	.00	.00	.00
		Minimum	0	0	2	0	0	0	0	0
		Maximum	0	0	7	10	0	0	0	0
	30	Mean	.00	.00	.40	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	1	0	0	0	0	0
	49	Mean	.00	.00	3.40	.00	.00	.00	.00	.00
		Minimum	0	0	1	0	0	0	0	0
		Maximum	0	0	5	0	0	0	0	0
M. duboulayi	1	Mean	.00	.00	.00	.00	.00	.00	.00	.00
	4	Mean	.00	.00	.30	.10	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	1	1	0	0	0	0
	17	Mean	.00	.00	.00	.67	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0

TABLE E1 cont. Mean abundance of parasite species infections on hosts at individual locations.

Host species	loc IDF		*R. chelatus*	*R. signiferi*	*H. splendidae*	*H. megaloanchor*	*H. mcivori*	*H. marjoriaea*	*H. maccullochii*	*H. gertrudaea*
M. duboulayi		Maximum	0	0	0	3	0	0	0	0
	38	Mean	.00	.00	.30	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	1	0	0	0	0	0
M. sp.	20	Mean	.00	.00	.86	1.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	2	10	0	0	0	0
M. s. splendida	2	Mean	.00	.00	.63	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	1	0	0	0	0	0
	6	Mean	.00	.00	2.67	1.50	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	10	5	0	0	0	0
	12	Mean	.00	.00	.60	.60	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	2	3	0	0	0	0
	21	Mean	.00	.00	.00	.25	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	0	1	0	0	0	0
	22	Mean	.00	.00	.31	.92	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	2	4	0	0	0	0
	25	Mean	.00	.00	.00	.00	.00	.00	.00	.00
	31	Mean	.00	.00	1.23	.23	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	5	1	0	0	0	0
	33	Mean	.00	.00	2.00	.00	.00	.00	.00	.00
		Minimum	0	0	1	0	0	0	0	0
		Maximum	0	0	3	0	0	0	0	0
	35	Mean	.00	.00	.33	1.83	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	1	7	0	0	0	0
	39	Mean	.00	.00	.00	.60	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	0	2	0	0	0	0
	53	Mean	.00	.00	2.00	.00	.00	.00	.00	.00
		Minimum	0	0	2	0	0	0	0	0
		Maximum	0	0	2	0	0	0	0	0
M. s. inornata	10	Mean	.00	.00	6.11	3.68	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	16	10	0	0	0	0
	16	Mean	.00	.00	.20	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	1	0	0	0	0	0
	19	Mean	.00	.00	.00	.00	.00	.00	.00	.00
	23	Mean	.00	.00	.20	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	2	0	0	0	0	0
	29	Mean	.00	.00	.36	.45	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0

TABLE E1 cont. Mean abundance of parasite species infections on hosts at individual locations.

Host species	loc IDF		*R. chelatus*	*R. signiferi*	*H. splendidae*	*H. megaloanchor*	*H. mcivori*	*H. marjoriaea*	*H. maccullochii*	*H. gertrudaea*
M. s. inornata		Maximum	0	0	2	4	0	0	0	0
	32	Mean	.00	.00	.75	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	3	0	0	0	0	0
	43	Mean	.00	.00	.38	.38	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	2	2	0	0	0	0
	46	Mean	.00	.00	.00	.00	.00	.00	.00	.00
R. ornatus	5	Mean	.00	.00	.00	.00	.00	.00	.00	.00
	7	Mean	.00	.00	1.00	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	4	0	0	0	0	0
	9	Mean	.00	.00	.00	.00	.00	.00	.00	.00
	36	Mean	.00	.00	.00	.00	.00	.00	.00	.00
C. rhombosomoides	40	Mean	.00	.00	.00	.00	.00	.00	.00	.00
	54	Mean	.00	.00	.00	.00	.00	.00	.00	.00
P. gertrudae	18	Mean	.00	.00	.00	.00	.00	.00	.00	.00
	19	Mean	.00	.00	.00	.00	.00	.00	.00	1.35
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	0	0	0	0	0	4
P. signifer	12	Mean	.00	1.20	.00	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	4	0	0	0	0	0	0
	22	Mean	.00	10.60	.00	.00	.00	.00	.00	.00
		Minimum	0	2	0	0	0	0	0	0
		Maximum	0	20	0	0	0	0	0	0
	35	Mean	.00	20.40	.00	.00	.00	.20	.00	.00
		Minimum	0	3	0	0	0	0	0	0
		Maximum	0	40	0	0	0	1	0	0
	41	Mean	.00	33.00	.00	.00	.00	.00	.00	.00
		Minimum	0	17	0	0	0	0	0	0
		Maximum	0	48	0	0	0	0	0	0
	50	Mean	.00	2.00	.00	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	5	0	0	0	0	0	0
C. marjoriae	1	Mean	.00	.00	.00	.00	.00	20.62	.00	.00
		Minimum	0	0	0	0	0	7	0	0
		Maximum	0	0	0	0	0	28	0	0
C. helenae	15	Mean	.00	.00	.00	.00	.00	.00	.00	.00
C. stramineus	51	Mean	.00	.00	.00	.00	.00	.00	.00	.00
	52	Mean	.00	.00	.00	.00	.00	.00	.00	.00
C. s. stercusmuscarum	3	Mean	21.18	.00	.00	.00	.00	.00	.00	.00
		Minimum	6	0	0	0	0	0	0	0
		Maximum	47	0	0	0	0	0	0	0
	16	Mean	.67	.00	.00	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	1	0	0	0	0	0	0	0
	17	Mean	3.00	.00	.00	.00	.00	.00	.00	.00
		Minimum	3	0	0	0	0	0	0	0
		Maximum	3	0	0	0	0	0	0	0

TABLE E1 cont. Mean abundance of parasite species infections on hosts at individual locations.

Host species	loc IDF		*R. chelatus*	*R. signifieri*	*H. splendidae*	*H. megaloanchor*	*H. mcivori*	*H. marjoriaea*	*H. maccullochii*	*H. gertrudaea*
C. s. stercusmuscarum	19	Mean	20.67	.00	.00	.00	.00	.00	.00	.00
		Minimum	5	0	0	0	0	0	0	0
		Maximum	45	0	0	0	0	0	0	0
	28	Mean	16.50	.00	.00	.00	.00	.00	.00	.00
		Minimum	6	0	0	0	0	0	0	0
		Maximum	35	0	0	0	0	0	0	0
	33	Mean	6.67	.00	.00	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	12	0	0	0	0	0	0	0
	39	Mean	8.94	.00	.00	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	28	0	0	0	0	0	0	0
M. trifasciata	16	Mean	.00	.00	1.00	.00	2.17	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	4	0	8	0	0	0
	25	Mean	.00	.00	.00	.00	1.53	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	0	0	6	0	0	0
	26	Mean	.00	.00	.40	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	1	0	0	0	0	0
	43	Mean	.00	.00	.00	.13	1.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	0	1	2	0	0	0
"M. eachutchee"	3	Mean	.00	.00	.80	.60	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	3	2	0	0	0	0
	27	Mean	.00	.00	.33	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	2	0	0	0	0	0
	47	Mean	.00	.00	1.64	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0	0	0
		Maximum	0	0	5	0	0	0	0	0
	48	Mean	.00	.00	.00	.00	.00	.00	.00	.00

TABLE E2. Mean abundance of infections for species of *Longidigitis* on hosts at individual locations.

Host species	loc IDF		*L. auripontiformis*	*L. maccullochi*	*L. gracilis*	*L. utcheei*	*L. hopevalensis*	*L. robustus*
M. eachamensis	14	Mean	.00	.00	.16	.00	.00	.00
		Minimum	0	0	0	0	0	0
		Maximum	0	0	2	0	0	0
	18	Mean	.00	.00	1.60	.00	.00	.00
		Minimum	0	0	0	0	0	0
		Maximum	0	0	4	0	0	0
M. exquisita	26	Mean	2.88	.00	.35	.00	.00	.00
		Minimum	0	0	0	0	0	0
		Maximum	8	0	3	0	0	0
M. gracilis	15	Mean	.44	.00	1.28	.00	.00	.00
		Minimum	0	0	0	0	0	0
		Maximum	4	0	10	0	0	0
	34	Mean	4.14	.00	.14	.00	.00	.29
		Minimum	2	0	0	0	0	0
		Maximum	8	0	1	0	0	2
M. maccullochii	12	Mean	.00	7.78	.00	.00	.00	.00
		Minimum	0	3	0	0	0	0
		Maximum	0	14	0	0	0	0
	56	Mean	.67	6.83	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0
		Maximum	2	18	0	0	0	0
M. nigrans	11	Mean	5.00	.00	3.00	.00	.00	.00
		Minimum	2	0	2	0	0	0
		Maximum	8	0	4	0	0	0
	19	Mean	1.36	.00	.86	.00	.00	.00
		Minimum	0	0	0	0	0	0
		Maximum	5	0	3	0	0	0
M. utcheensis	40	Mean	.00	.00	2.00	.00	.00	.00
		Minimum	0	0	0	0	0	0
		Maximum	0	0	11	0	0	0
M. australis	8	Mean	1.73	.00	1.73	.00	.00	.00
		Minimum	0	0	0	0	0	0
		Maximum	7	0	5	0	0	0
	13	Mean	4.50	.00	2.00	.00	.00	.00
		Minimum	1	0	0	0	0	0
		Maximum	8	0	5	0	0	0
	15	Mean	2.09	.00	.73	.00	.00	.00
		Minimum	0	0	0	0	0	0
		Maximum	5	0	4	0	0	0
	24	Mean	6.60	.00	1.50	.00	.00	.00
		Minimum	2	0	0	0	0	0
		Maximum	23	0	3	0	0	0
	30	Mean	19.10	.00	8.00	.00	.00	.00
		Minimum	7	0	3	0	0	0
		Maximum	37	0	17	0	0	0
	49	Mean	.00	.00	1.20	.00	.00	.00
		Minimum	0	0	0	0	0	0
		Maximum	0	0	2	0	0	0
M. duboulayi	1	Mean	1.83	.00	.17	.00	.00	.00

TABLE E2 cont. Mean abundance of infections for species of *Longidigitis* on hosts at individual locations.

Host species	loc IDF		*L. auripontiformis*	*L. maccullochi*	*L. gracilis*	*L. utcheei*	*L. hopevalensis*	*L. robustus*
M. duboulayi		Minimum	0	0	0	0	0	0
		Maximum	6	0	1	0	0	0
	4	Mean	1.90	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0
		Maximum	4	0	0	0	0	0
	17	Mean	2.60	.00	.27	.00	.00	1.27
		Minimum	1	0	0	0	0	0
		Maximum	10	0	3	0	0	7
	38	Mean	4.00	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0
		Maximum	12	0	0	0	0	0
M. sp.	20	Mean	4.07	.00	.29	.00	.00	.07
		Minimum	2	0	0	0	0	0
		Maximum	8	0	2	0	0	1
M. s. splendida	2	Mean	9.13	.00	.00	.00	.00	.38
		Minimum	3	0	0	0	0	0
		Maximum	21	0	0	0	0	2
	6	Mean	4.67	.00	.00	.00	.00	.33
		Minimum	1	0	0	0	0	0
		Maximum	9	0	0	0	0	2
	12	Mean	1.70	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0
		Maximum	11	0	0	0	0	0
	21	Mean	6.50	.00	.00	.00	.00	.00
		Minimum	4	0	0	0	0	0
		Maximum	9	0	0	0	0	0
	22	Mean	2.69	.00	.00	.00	.00	.15
		Minimum	0	0	0	0	0	0
		Maximum	5	0	0	0	0	1
	25	Mean	3.17	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0
		Maximum	11	0	0	0	0	0
	31	Mean	2.23	.00	.00	.00	.00	.00
		Minimum	1	0	0	0	0	0
		Maximum	5	0	0	0	0	0
	33	Mean	4.50	.00	.00	.00	.00	.25
		Minimum	3	0	0	0	0	0
		Maximum	6	0	0	0	0	1
	35	Mean	4.33	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0
		Maximum	11	0	0	0	0	0
	39	Mean	2.50	.00	.00	.00	.00	.10
		Minimum	0	0	0	0	0	0
		Maximum	9	0	0	0	0	1
	53	Mean	3.00	.00	.00	.00	.00	.00
		Minimum	3	0	0	0	0	0
		Maximum	3	0	0	0	0	0

TABLE E2 cont. Mean abundance of infections for species of *Longidigitis* on hosts at individual locations.

Host species	loc IDF		*L. auripontiformis*	*L. macculloch*i	*L. gracilis*	*L. utcheei*	*L. hopevalensis*	*L. robustus*
M. s. inornata	10	Mean	7.16	.00	.00	.00	.00	.11
		Minimum	2	0	0	0	0	0
	16	Mean	3.20	.00	.00	.00	.00	.00
		Minimum	1	0	0	0	0	0
		Maximum	6	0	0	0	0	0
	19	Mean	4.00	.00	.00	.00	.00	2.50
		Minimum	2	0	0	0	0	0
		Maximum	6	0	0	0	0	5
	23	Mean	14.50	.00	.00	.00	.00	.00
		Minimum	2	0	0	0	0	0
		Maximum	36	0	0	0	0	0
	29	Mean	6.64	.00	.00	.00	.00	.27
		Minimum	2	0	0	0	0	0
		Maximum	15	0	0	0	0	1
	32	Mean	4.00	.00	.00	.00	.00	.25
		Minimum	0	0	0	0	0	0
		Maximum	7	0	0	0	0	1
	43	Mean	2.54	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0
		Maximum	7	0	0	0	0	0
	46	Mean	12.00	.00	.00	.00	.00	1.00
		Minimum	4	0	0	0	0	0
		Maximum	40	0	0	0	0	3
R. ornatus	5	Mean	.00	.00	.00	.00	.00	.00
	7	Mean	.00	.00	.00	.00	.00	.00
	9	Mean	.00	.00	.00	.00	.00	.00
	36	Mean	.00	.00	.00	.00	.00	.00
C. rhombosomoides	40	Mean	.00	.00	.00	9.80	.00	.00
		Minimum	0	0	0	5	0	0
		Maximum	0	0	0	14	0	0
	54	Mean	.00	.00	.00	1.43	.00	.00
		Minimum	0	0	0	0	0	0
		Maximum	0	0	0	5	0	0
P. gertrudae	18	Mean	.00	.00	.00	.00	.00	.00
	19	Mean	.00	.00	.00	.00	.00	.00
P. signifer	12	Mean	.00	.00	.00	.00	.00	.00
	22	Mean	.00	.00	.00	.00	.00	.00
	35	Mean	.00	.00	.00	.00	.00	.00
	41	Mean	.00	.00	.00	.00	.00	.00
	50	Mean	.00	.00	.00	.00	.00	.00
C. marjoriae	1	Mean	.00	.00	.00	.00	.00	.00
C. helenae	15	Mean	.00	.00	.00	.00	.00	.00
C. stramineus	51	Mean	.00	.00	.00	.00	.00	.00
	52	Mean	.00	.00	.00	.00	.00	.00
C. s. stercusmuscarum	3	Mean	.00	.00	.00	.00	.00	.00
	16	Mean	.00	.00	.00	.00	.00	.00
	17	Mean	.00	.00	.00	.00	.00	.00
	19	Mean	.00	.00	.00	.00	.00	.00
	28	Mean	.00	.00	.00	.00	.00	.00
	33	Mean	.00	.00	.00	.00	.00	.00

TABLE E2 cont. Mean abundance of infections for species of *Longidigitis* on hosts at individual locations.

Host species	loc IDF		*L. auripontiformis*	*L. maccullochi*	*L. gracilis*	*L. utcheei*	*L. hopevalensis*	*L. robustus*
	39	Mean	.00	.00	.00	.00	.00	.00
M. trifasciata	16	Mean	2.17	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0
		Maximum	5	0	0	0	0	0
	25	Mean	.00	.00	.00	.00	1.18	.00
		Minimum	0	0	0	0	0	0
		Maximum	0	0	0	0	5	0
	26	Mean	1.20	.00	.00	.00	.00	.00
		Minimum	0	0	0	0	0	0
		Maximum	2	0	0	0	0	0
	43	Mean	.50	.00	.00	.00	.38	.00
		Minimum	0	0	0	0	0	0
		Maximum	3	0	0	0	2	0
"M. eachutchee"	3	Mean	4.50	.00	.00	.00	.00	1.40
		Minimum	2	0	0	0	0	0
		Maximum	8	0	0	0	0	4
	27	Mean	.05	.00	.48	.00	.00	.00
		Minimum	0	0	0	0	0	0
		Maximum	1	0	2	0	0	0
	47	Mean	.00	.00	.00	.00	.00	.00
	48	Mean	.00	.00	.00	.00	.00	.00

TABLE E3. Mean abundance of infections for species of *Iliocirrus* on hosts at individual locations.

Host species	loc IDF		*I. iliocirrus*	*I. ornatusi*	*I. trifasciatae*	*I. mazlini*	*I. rossi*
M. eachamensis	14	Mean	.00	.00	.00	4.95	.00
		Minimum	0	0	0	0	0
		Maximum	0	0	0	14	0
	18	Mean	.30	.00	.00	3.00	.00
		Minimum	0	0	0	0	0
		Maximum	3	0	0	10	0
M. exquisita	26	Mean	6.88	.00	.00	.00	.00
		Minimum	1	0	0	0	0
		Maximum	18	0	0	0	0
M. gracilis	15	Mean	3.61	.00	.00	.00	.00
		Minimum	0	0	0	0	0
		Maximum	13	0	0	0	0
	34	Mean	15.00	.00	.00	.00	.00
		Minimum	9	0	0	0	0
		Maximum	21	0	0	0	0
M. maccullochii	12	Mean	.11	.00	.00	.00	.00
	56	Mean	.00	.00	.00	.00	.00
M. nigrans	11	Mean	11.00	.00	.00	.00	.00
		Minimum	5	0	0	0	0
		Maximum	17	0	0	0	0
	19	Mean	4.43	.00	.00	.00	.00
		Minimum	0	0	0	0	0
		Maximum	9	0	0	0	0
M. utcheensis	40	Mean	.00	.00	.00	1.35	.00
		Minimum	0	0	0	0	0
		Maximum	0	0	0	4	0
M. australis	8	Mean	6.67	.00	.00	.00	.00
		Minimum	0	0	0	0	0
		Maximum	24	0	0	0	0
	13	Mean	8.50	.00	.00	.00	.00
		Minimum	1	0	0	0	0
		Maximum	14	0	0	0	0
	15	Mean	4.09	.00	.00	.00	.00
		Minimum	0	0	0	0	0
		Maximum	16	0	0	0	0
	24	Mean	11.30	.00	.00	.00	.00
		Minimum	4	0	0	0	0
		Maximum	30	0	0	0	0
	30	Mean	33.50	.00	.00	.00	.00
		Minimum	19	0	0	0	0
		Maximum	66	0	0	0	0
	49	Mean	1.20	.00	.00	.00	.00
		Minimum	0	0	0	0	0
		Maximum	2	0	0	0	0
M. duboulayi	1	Mean	2.17	.00	.00	.00	.00
		Minimum	0	0	0	0	0
		Maximum	9	0	0	0	0

TABLE E3 cont. Mean abundance of infections for species of *Iliocirrus* on hosts at individual locations.

Host species	loc IDF		*I. iliocirrus*	*I. ornatusi*	*I. trifasciatae*	*I. mazlini*	*I. rossi*
M. duboulayi	4	Mean	2.30	.00	.00	.10	.00
		Minimum	0	0	0	0	0
		Maximum	9	0	0	1	0
	17	Mean	6.33	.00	.00	.00	.00
		Minimum	1	0	0	0	0
		Maximum	23	0	0	0	0
	38	Mean	7.60	.00	.00	.00	.00
		Minimum	3	0	0	0	0
		Maximum	21	0	0	0	0
M. sp.	20	Mean	12.79	.00	.14	.00	.00
		Minimum	4	0	0	0	0
		Maximum	35	0	1	0	0
M. s. splendida	2	Mean	24.38	.00	.00	.00	.00
		Minimum	11	0	0	0	0
		Maximum	34	0	0	0	0
	6	Mean	11.33	.00	.00	.00	.00
		Minimum	6	0	0	0	0
		Maximum	21	0	0	0	0
	12	Mean	1.90	.00	.00	.00	.00
		Minimum	0	0	0	0	0
		Maximum	10	0	0	0	0
	21	Mean	11.00	.00	.00	.00	.00
		Minimum	6	0	0	0	0
		Maximum	17	0	0	0	0
	22	Mean	14.38	.00	.00	.00	.00
		Minimum	0	0	0	0	0
		Maximum	35	0	0	0	0
	25	Mean	8.00	.00	.00	.17	.00
		Minimum	1	0	0	0	0
		Maximum	35	0	0	1	0
	31	Mean	10.15	.00	.00	.00	.00
		Minimum	4	0	0	0	0
		Maximum	24	0	0	0	0
	33	Mean	10.75	.00	.00	.00	.00
		Minimum	5	0	0	0	0
		Maximum	18	0	0	0	0
	35	Mean	7.17	.00	.00	.00	.00
		Minimum	5	0	0	0	0
		Maximum	10	0	0	0	0
	39	Mean	4.70	.00	.00	.00	.00
		Minimum	0	0	0	0	0
		Maximum	12	0	0	0	0
	53	Mean	17.00	.00	.00	.00	.00
		Minimum	17	0	0	0	0
		Maximum	17	0	0	0	0
M. s. inornata	10	Mean	.63	.00	.00	.00	.00
		Minimum	0	0	0	0	0
		Maximum	4	0	0	0	0
	16	Mean	8.20	.00	.00	.00	.00
		Minimum	5	0	0	0	0

TABLE E3 cont. Mean abundance of infections for species of *Iliocirrus* on hosts at individual locations.

Host species	loc IDF		*I. iliocirrus*	*I. ornatusi*	*I. trifasciatae*	*I. mazlini*	*I. rossi*
M. s. inornata		Maximum	11	0	0	0	0
	19	Mean	17.50	.00	.00	.00	.00
		Minimum	14	0	0	0	0
		Maximum	21	0	0	0	0
	23	Mean	29.30	.00	.00	.00	.00
		Minimum	13	0	0	0	0
		Maximum	57	0	0	0	0
	29	Mean	20.36	.00	.00	.00	.00
		Minimum	5	0	0	0	0
		Maximum	43	0	0	0	0
	32	Mean	5.50	.00	.00	.00	.00
		Minimum	1	0	0	0	0
		Maximum	16	0	0	0	0
	43	Mean	9.00	.00	.00	.15	.00
		Minimum	1	0	0	0	0
		Maximum	19	0	0	1	0
	46	Mean	26.29	.00	.00	.14	.00
		Minimum	4	0	0	0	0
		Maximum	72	0	0	1	0
R. ornatus	5	Mean	.00	4.14	.00	.00	.00
	7	Mean	.00	6.18	.00	.00	.00
	9	Mean	.00	2.39	.00	.00	.00
	36	Mean	.00	3.31	.00	.00	.00
C. rhombosomoides	40	Mean	.60	.00	.00	.00	.00
		Minimum	0	0	0	0	0
		Maximum	3	0	0	0	0
	54	Mean	2.71	.00	.00	.00	.00
		Minimum	0	0	0	0	0
		Maximum	9	0	0	0	0
P. gertrudae	18	Mean	.00	.00	.00	.00	.00
	19	Mean	.00	.00	.00	.00	.00
P. signifer	12	Mean	.00	.00	.00	.00	.00
	22	Mean	.00	.00	.00	.00	.00
	35	Mean	.00	.00	.00	.00	.00
	41	Mean	.00	.00	.00	.00	.00
	50	Mean	.00	.00	.00	.00	.00
C. marjoriae	1	Mean	.00	.00	.00	.00	.00
C. helenae	15	Mean	.00	.00	.00	.00	.00
C. stramineus	51	Mean	.00	.00	.00	.00	.00
	52	Mean	.00	.00	.00	.00	.00
C. s. stercusmuscarum	3	Mean	.00	.00	.00	.00	5.45
		Minimum	0	0	0	0	1
		Maximum	0	0	0	0	16
	16	Mean	.00	.00	.00	.00	1.00
		Minimum	0	0	0	0	0
		Maximum	0	0	0	0	2
	17	Mean	.00	.00	.00	.00	7.00
		Minimum	0	0	0	0	7
		Maximum	0	0	0	0	7
	19	Mean	.00	.00	.00	.00	5.67

Table 3E cont. Mean abundance of infections for species of *Iliocirrus* on hosts at individual locations

Host species	loc IDF		*I. iliocirrus*	*I. ornatusi*	*I. trifasciatae*	*I. mazlini*	*I. rossi*
C. s. stercusmuscarum		Minimum	0	0	0	0	0
		Maximum	0	0	0	0	14
	28	Mean	.00	.00	.00	.00	2.38
		Minimum	0	0	0	0	0
		Maximum	0	0	0	0	11
	33	Mean	.00	.00	.00	.00	21.33
		Minimum	0	0	0	0	18
		Maximum	0	0	0	0	28
	39	Mean	.00	.00	.00	.00	8.76
		Minimum	0	0	0	0	0
		Maximum	0	0	0	0	22
M. trifasciata	16	Mean	10.17	.00	6.83	.00	.00
		Minimum	1	0	0	0	0
		Maximum	27	0	23	0	0
	25	Mean	.18	.00	19.82	.00	.00
		Minimum	0	0	1	0	0
		Maximum	2	0	51	0	0
	26	Mean	.80	.00	.00	.00	.00
		Minimum	0	0	0	0	0
		Maximum	3	0	0	0	0
	43	Mean	2.62	.00	3.00	.00	.00
		Minimum	0	0	0	0	0
		Maximum	6	0	9	0	0
"M. eachutchee"	3	Mean	13.90	.00	.00	3.20	.00
		Minimum	6	0	0	0	0
		Maximum	24	0	0	9	0
	27	Mean	1.43	.00	.00	.67	.00
		Minimum	0	0	0	0	0
		Maximum	10	0	0	2	0
	47	Mean	.00	.00	.00	2.00	.00
		Minimum	0	0	0	0	0
		Maximum	0	0	0	11	0
	48	Mean	9.40	.00	.00	.60	.00
		Minimum	0	0	0	0	0
		Maximum	32	0	0	2	0

TABLE E4. Spearman rank correlation coefficients between parasite species for ln transformed data of abundance of individual host specimen.

Bold types are positive significant correlations. ** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed)

Parasite sp.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. *H. splendidae*	1.000																		
2. *H. megaloanchor*	**.215	1.000																	
3. *H. mcivori*	-.050	-.052	1.000																
4. *H. marjoriaea*	**-.087	-.050	-.022	1.000															
5. *H. maccullochii*	-.051	-.030	-.013	-.013	1.000														
6. *I. iliocirrus*	**.156	**.180	-.014	**-.138	-.082	1.000													
7. *L. auripontiformis*	**.292	**.329	*-.084	**-.123	-.046	**.769	1.000												
8. *L. maccullochii*	-.017	*.089	-.021	-.021	**.492	**-.122	**-.118	1.000											
9. *L. trifasciatae*	-.075	-.069	**.754	-.030	-.018	-.030	*-.093	-.029	1.000										
10. *L. gracilis*	**.207	-.043	-.063	-.061	-.036	**.156	**.118	-.059	*-.084	1.000									
11. *L. utcheei*	-.069	-.040	-.018	-.017	-.010	-.036	*-.098	-.017	-.024	-.049	1.000								
12. *I. ornatusi*	**-.123	**-.104	-.046	-.044	-.026	**-.285	**-.254	-.043	-.061	**-.126	-.036	1.000							
13. *I. mazlini*	**.183	-.012	-.053	-.051	-.031	**-.118	**-.171	-.050	-.071	**.170	-.041	**-.106	1.000						
14. *I. rossi*	**-.139	*-.081	-.036	-.035	-.021	**-.222	**-.198	-.033	-.048	*-.098	-.028	-.071	*-.083	1.000					
15. *R. chelatus*	**-.143	*-.083	-.037	-.036	-.021	**-.229	**-.203	-.034	-.049	**-.101	-.028	-.074	*-.085	**.914	1.000				
16. *R. signiferi*	**-.133	*-.077	-.034	.017	-.020	**-.212	**-.188	-.032	-.045	*-.094	-.026	-.068	*-.079	-.053	-.055	1.000			
17. *H. gertrudaea*	-.073	-.042	-.019	-.018	-.011	**-.116	**-.104	-.017	-.025	-.052	-.014	-.037	-.043	-.029	-.030	-.028	1.000		
18. *L. robustus*	.010	.075	-.032	-.031	-.018	**.215	**.267	-.030	-.042	-.030	-.025	-.064	.050	-.049	-.051	-.047	-.026	1.000	
19. *L. hopevalensis*	-.073	-.042	**.478	-.018	-.011	-.073	**-.104	-.017	**.619	-.052	-.014	-.037	-.043	-.029	-.030	-.028	-.015	-.026	1.000

TABLE E5. Host sample locations and habitat index category

Index	Location	Count	ln mean	Maximum	Minimum
1	4	10	1.57	2.71	.00
	8	15	2.16	3.64	.69
	11	2	2.91	3.33	2.48
	12	18	1.85	3.30	.00
	26	20	2.05	3.40	.69
	27	21	1.18	2.40	.00
	47	11	1.16	2.64	.00
	56	6	2.31	3.14	1.10
2	14	20	1.86	3.26	.00
	18	10	1.82	2.71	.00
	20	14	2.91	3.71	2.40
	31	13	2.54	3.43	1.61
	40	20	1.84	2.89	.69
	48	10	1.87	3.53	.00
	49	5	1.88	2.20	1.39
	53	1	3.14	3.14	3.14
3	1	6	1.28	2.77	.00
	3	11	3.16	3.69	2.30
	19	14	1.84	2.64	.00
	32	4	2.08	3.33	.69
	43	14	2.34	3.30	1.10
4	15	23	1.50	3.18	.00
	17	15	2.31	3.76	1.39
	23	10	3.60	4.54	2.64
	25	17	2.87	3.97	1.10
	38	10	2.35	3.53	1.61
5	2	8	3.47	3.87	2.89
	10	19	2.81	3.69	1.79
	13	8	2.82	3.33	1.61
	24	10	3.25	4.11	2.77
	29	8	3.30	3.93	2.40
	34	7	2.90	3.37	2.40
	39	1	2.20	2.20	2.20
	46	7	3.40	4.81	2.30