the rocky communities of both lakes, particularly among the algal scrapers, insect pickers and zooplanktivores. Furthermore, the Lake Victoria species take hooks baited with worms or meat suggesting that, like the Mbuna, they are facultative opportunists as well as specialist feeders.

(iv) Populations of the different rocky islands of Lake Victoria are isolated and it appears that little migration occurs between them as the fishes show a reluctance to cross the inimical deep habitats that separate islands. Limited migration does occur, however, as Van Oijen *et al.* (1981) found that a rocky jetty which was situated more than 100 m from the nearest rocky shore was inhabited by *Haplochromis nigricans* within months of its construction.

Another example of parallel evolution is demonstrated by *Paralabidochromis victoriae* Greenwood, 1956. This Lake Victoria species is so similar to *Labidochromis vellicans* of Lake Malawi with regard to its dentition, its jaw structure and general morphology that it could have been placed in the same genus. However, as the two species are endemic to different lakes and have separate phylogenies, Greenwood (1956) chose to erect the genus *Paralabidochromis* for the Lake Victoria species. Only one specimen of *P. victoriae* has been found and it is not known whether the species frequents rocky zones, but as it differs from the other rock dwellers in that it lacks the minute scalation of chest, nape and cheek (Lewis 1982) it is conceivable that it is not a member of the rocky community.

Lake Malawi and Lake Tanganyika are both deep, narrow, long rift valley lakes with clear water and fairly extensive rocky shores. These lakes do not share a single cichlid species, but the unique cichlid fauna of each exhibits several striking examples of convergent evolution. Both lakes support speciose, colourful communities of small rock-dwelling fishes whose members appear to fill very similar ecological roles in each lake and many have strong morphological parallels. Indeed the close similarities of the fishes of these two lakes have occasioned comment before (Regan 1921, 1922; Fryer & Iles 1972; Lowe-McConnell 1975; Stiassny 1980; Lewis 1981; Yamaoka 1982). This remarkable degree of parallelism is well illustrated by the *Petrochromis* species of Lake Tanganyika which are very similar morphologically (particularly with regard to dentition), behaviourally and ecologically to the *Petrotilapia* species of Lake Malawi (Fryer & Iles 1972; Liem 1980; Yamaoka 1982). Similarly, the genus *Tropheus* closely resembles members of the *Pseudotropheus tropheops* species-complex, as indicated by Regan (1921) when he erected the genus *Pseudotropheus*. In addition, the *Labidochromis* species of Lake Malawi have much in common with *Tanganicodus irsacae* of Lake Tanganyika.

A further parallel is that populations of rock-frequenting cichlids of Lake Tanganyika are usually restricted to particular geographic localities, being isolated from one another by unsuitable habitats. A particularly good example is provided by *Tropheus moori* which exists as a number of different geographic races, or perhaps subspecies, each differing from the others with respect to coloration (Marlier 1959; Matthes 1962; Fryer & Iles 1972). In addition, a number of sibling species occur sympatrically (Marlier 1959; Fryer & Iles 1972). Thus, in many respects the rock-frequenting fishes of the three Great Lakes of Africa exhibit a remarkable degree of parallelism at the community level, at the species level and with regard to species proliferation and adaptive radiation.

Furthermore, the restriction of cichlid populations to habitat islands strongly suggests that intralacustrine allopatric speciation is the main cause of the considerable species richness in the rift valley lakes, and was a contributory factor to speciation in Lake Victoria.

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REFERENCES

AHL, E. 1927. Einige neue Fische der Famile Cichlidae aus dem Nyassa-see. *Schr. berl. Ges. naturf. Fr. Berl.* 1926: 51 – 62.

ALBRECHT, H. 1963. 'Das Jungeführen bei *Haplochromis* (Pisces; Cichlidae).' *Z. Tierpsychol.* 20: 680 – 687.

AXELROD, H. & BURGESS, W. 1977. African cichlids of Lakes Malawi and Tanganyika. Ed. 6. T.F.H. Publ., New Jersey.

BAERENDS, G.P. & BAERENDS-VAN ROON, J.M. 1950. An introduction to the study of the ethology of cichlid fishes. *Behaviour suppl.* 1: 1 – 242.

BANISTER, K.E. & CLARKE, M.A. 1980. A revision of the large *Barbus* (Pisces, Cyprinidae) of Lake Malawi with a reconstruction of the history of the southern African Rift Valley lakes. *J. nat. Hist.* 14: 483 – 542.

BAREL, C.D.N., VAN OIJEN, M.J.P., WITTE, F. & WITTE-MAAS, E.L.M. 1977. An introduction to the taxonomy and morphology of the haplochromine Cichlidae from Lake Victoria. *Neth. J. Zool.* 27: 333 – 389.

BEADLE, L.C. 1974. The inland waters of tropical Africa. An introduction to tropical limnology. Longman, London.

BEADLE, L.C. 1981. The inland waters of tropical Africa. An introduction to tropical limnology. Ed. 2. Longman, New York.

BEAUCHAMP, R.S.A. 1940. Chemistry and hydrography of Lakes Tanganyika and Nyasa. *Nature, Lond.* 146: 253 – 256.

BEAUCHAMP, R.S.A. 1953. Hydrological data from Lake Nyasa. *J. Ecol.* 41: 226 – 239.

BOULENGER, G.A. 1899. A revision of the Asyrian fishes of the family Cichlidae: Part 2. *Proc. zool. Soc. Lond.* 1899: 134 – 144.

BOULENGER, G.A. 1901. Diagnoses of four new fishes discovered by Mr J.E.S. Moore in Lakes Tanganyika and Kiva *Ann. Mag. nat. Hist.* (7) 8: 1 – 6.

BOULENGER, G.A. 1909 – 1916. Catalogue of the freshwater fishes of Africa in the British Museum. *Br. Mus. nat. Hist. Lond.*: 1 – 4.

BURGESS, W.E. 1976. A new *Melanochromis* from Lake Malawi with comments on the genus. *Trop. Fish Hobby.* 14: 61 – 65.

COLOMBÉ, J. 1979. *Pseudotropheus tropheops romandi* sous — espèce nouvelle du lac Malawi (Pisces, Teleostei, Cichlidae). *Rev. fr. Aquariol.* 6: 33 – 38.

CROSSLEY, R. 1982. Ancient flood levels of Lake Malawi. *Malawi Rev.* 1: 11 – 14.

CROWLEY, T.E., PAIN, T. & WOODWARD, F.R. 1964. A monographic review of the Mollusca of Lake Nyasa. *Annls Mus. r. Afr. cent.* 131: 1 – 58.

DIXEY, F. 1926. The Nyasaland section of the Great Rift Valley. *Geogrl J.*: 117 – 140.

DIXEY, F. 1941. The Nyasa Rift Valley. *S. Afr. geogr. J.* 23: 21 – 45.

ECCLES, D.H. 1973. Two new species of cichlid fishes from Lake Malawi (formerly known as Lake Nyasa). *Arnoldia, (Rhodesia)* 16: 1 – 7.

ECCLES, D.H. 1974. An outline of the physical limnology of Lake Malawi (Lake Nyasa). *Limnol. Oceanogr.* 19: 730 – 742.

ECCLES, D.H. & LEWIS, D.S.C. 1976. A revision of the genus *Docimodus* Boulenger (Pisces, Cichlidae), a group of fishes with unusual feeding habits from Lake Malawi. *Zool. J. Linn. Soc.* 58: 165 – 172.

ECCLES, D.H. & LEWIS, D.S.C. 1977. A taxonomic study of the genus *Lethrinops* Regan (Pisces-Cichlidae) from Lake Malawi. Part I. *Ichthyol. Bull. Rhodes Univ.* 36: 1 – 12.

ECCLES, D.H. & LEWIS, D.S.C. 1978. A taxonomic study of the genus *Lethrinops* Regan (Pisces-Cichlidae) from Lake Malawi. Part 2. *Ichthyol. Bull. Rhodes Univ.* 37: 1 – 11.

ECCLES, D.H. & LEWIS, D.S.C. 1979. A taxonomic study of the genus *Lethrinops* Regan (Pisces-Cichlidae). Part 3. *Ichthyol. Bull. Rhodes Univ.* 38: 1 – 25.

ECCLES, D.H. & LEWIS, D.S.C. 1981. Midwater spawning in *Haplochromis chrysonotus* (Boulenger) (Teleostei: Cichlidae) in Lake Malawi. *Envir. Biol. Fishes* 6: 201 – 202.

ELDREDGE, N. & GOULD, S.J. 1972. Punctuated equilibria: an alternative to phyletic gradualism. In: Models in Paleobiology, ed. Schopf, T.J.M.: 82 – 115. Freeman, San Francisco.

FRYER, G. 1956a. New species of cichlid fishes from Lake Nyasa. *Revue Zool. Bot. afr.* 53: 81 – 91.

FRYER, G. 1956b. New species of *Labeotropheus* from Lake Nyasa, with a redescription of *Labeotropheus fuelleborni* Ahl and some notes on the genus *Labeotropheus* (Pisces: Cichlidae). *Revue Zool. Bot. afr.* 54: 280 – 289.

FRYER, G. 1957. A new species of *Gephyrochromis* (Pisces: Cichlidae) from Lake Nyasa, with notes on its ecology and affinities. *Revue Zool. Bot. afr.* 55: 347 – 352.

FRYER, G. 1959a. The trophic interrelationships and ecology of some littoral communities in Lake Nyasa with especial reference to the fishes, and a discussion of the evolution of a group of rock-frequenting Cichlidae. *Proc. zool. Soc. Lond.* 132: 153 – 281.

FRYER, G. 1959b. Some aspects of evolution in Lake Nyasa. *Evolution* 13: 440 – 451.

FRYER, G. 1960. Some controversial aspects of speciation of African cichlid fishes. *Proc. zool. Soc. Lond.* 133: 629 – 647.

FRYER, G. 1965. Predation and its effects on migration and speciation in African fishes: a comment. With further comments by P.H. Greenwood, a reply by P.B.N. Jackson and a footnote and postscript by G. Fryer. *Proc. zool. Soc. Lond.* 144: 301 – 322.

FRYER, G. 1969. Speciation and adaptive radiation in African lakes. *Verh. int. Verein. theor. angew. Limnol.* 17: 303 – 322.

FRYER, G. 1972. Conservation of the great lakes of East Africa: A lesson and a warning. *Biol. Conserv.* 4: 256 – 262.

FRYER, G. 1977. Evolution of species-flocks of cichlid fishes in African Lakes. *Z. zool. Syst. Evol.-forsch.* 15: 141 – 165.

FRYER, G., GREENWOOD, P.H. & TREWAVAS, E. 1955. Scale-eating habits of African cichlid fishes. *Nature, Lond.* 175: 1089 – 1090.

FRYER, G. & ILES, T. 1955. Predation pressure and evolution in Lake Nyasa. *Nature, Lond.* 176: 470.

FRYER, G. & ILES, T.D. 1969. Alternative routes to evolutionary success among African cichlid fishes, as shown by the genus *Tilapia* and the species-flocks of the great lakes. *Evolution* 23: 359 – 369.

FRYER, G. & ILES, T.D. 1972. The cichlid fishes of the great lakes of Africa. Their biology and evolution. Oliver & Boyd, Edinburgh.

GREENWOOD, P.H. 1956. The monotypic genera of cichlid fishes in Lake Victoria. *Bull. Br. Mus. nat. Hist. (Zool.)* 3: 295 – 333.

GREENWOOD, P.H. 1965. The cichlid fishes of Lake Nabugabo, Uganda. *Bull. Br. Mus. nat. Hist. Zool.* 12: 315 – 357.

GREENWOOD, P.H. 1973. Morphology, endemism and speciation in African cichlid fishes. *Verh. dt. zool. Ges., Mainz* 1973: 115 – 124.

GREENWOOD, P.H. 1974. The cichlid fishes of Lake Victoria, East Africa: the biology and evolution of a species-flock. *Bull. Br. Mus. nat. Hist. (Zool.) Suppl.* 6: 1 – 134.

GREENWOOD, P.H. 1979a. Macroevolution — myth or reality? *Biol. J. Linn. Soc.* 12: 293 – 304.

GREENWOOD, P.H. 1979b. Towards a phyletic classification of the 'genus' *Haplochromis* and related taxa. Part I. *Bull. Br. Mus. nat. Hist. (Zool.)* 35: 265 – 322.

GREENWOOD, P.H. 1980. Towards a phyletic classification of the 'genus' *Haplochromis* (Pisces, Cichlidae) and related taxa. Part II; the species from Lakes Victoria, Nabugabo, Edward, George and Kivu. *Bull. Br. Mus. nat. Hist. (Zool.)* 39: 1 – 101.

GREENWOOD, P.H. 1981. Species-flocks and explosive evolution. In: Chance, change and challenge — the evolving biosphere, eds. Greenwood, P.H. & Forey, P.L. Cambridge Univ. Press. & Br. Mus. (Nat. Hist.), London.

GÜNTHER, A. 1864. Report on a collection of reptiles and fishes made by Dr Kirk in the Zambezi and Nyasa regions. *Proc. zool. Soc. Lond.* 1864: 303 – 314.

GÜNTHER, A. 1893. Second report on the reptiles, batrachians and fishes transmitted by Mr H.H. Johnston, C.B., from British Central Africa. *Proc. zool. Soc. Lond.* 1893: 616 – 628.

HILL, B.J. & RIBBINK, A.J. 1978. Depth equilibration of a shallow-water cichlid fish. *J. Fish Biol.* 13: 741 – 745.

HOLZBERG, S. 1978. A field and laboratory study of the behaviour and ecology of *Pseudotropheus zebra* (Boulenger), an endemic cichlid of Lake Malawi (Pisces: Cichlidae). *Z. zool. Syst. Evol.-forsch.* 16: 171 – 187.

ILES, T.D. 1960. A group of zooplankton feeders of the genus *Haplochromis* (Cichlidae) in Lake Nyasa. *Ann. Mag. nat. Hist.* (13), 2: 257 – 280.

JACKSON, P.B.N. 1961a. Check list of the fishes of Nyasaland. *Occ. Pap. natn. Mus. Rhod.* 3: 535 – 621.

JACKSON, P.B.N. 1961b. The impact of predation, especially by tigerfish (*Hydrocyon vittatus* Cast.) on African freshwater fish. *Proc. zool. Lond.* 136: 603 – 622.

JOHNSON, D.S. 1974. New cichlids from Lake Malawi. *Today's Aquarist* 1: 12 – 15.

JOHNSON, D.S. 1975. More new Malawi cichlids. *Today's Aquarist* 2: 15 – 26.

JOHNSON, D.S. 1976. New cichlid fishes (Pisces: Cichlidae) from Lake Malawi. *Today's Aquarist* 2: 17 – 24.

KORNFIELD, I.L. 1978. Evidence for rapid speciation in African cichlid fishes. *Experentia* 34: 335 – 336.

LEWIS, D.S.C. 1980. A further examination of the taxonomic status of *Labidochromis joanjohnsonae* Johnson 1974 with a redescription of the species. *Revue Zool. afr.* 94: 959 – 971.

LEWIS, D.S.C. 1981. Preliminary comparisons between the ecology of the haplochromine cichlid fishes of Lake Victoria and Lake Malawi. *Neth. J. Zool.* 31: 746 – 761.

LEWIS, D.S.C. 1982. A revision of the genus *Labidochromis* (Teleostei: Cichlidae) from Lake Malawi. *Zool. J. Linn. Soc.* 75: 189 – 265.

LIEM, K.F. 1973. Evolutionary strategies and morphological innovations: cichlid pharyngeal jaws. *Syst. Zool.* 22: 425 – 441.

LIEM, K.F. 1980. Adaptive significance of intra- and inter-specific differences in the feeding repertoires of cichlid fishes. *Am. Zool.* 20: 295 – 314.

LOISELLE, P.V. 1978. Reflections on the generic placement of *Haplochromis labrosus. Buntbarsche Bull.* 67: 16 – 18.

LOISELLE, P.V. 1979. *Melanochromis.* The beautiful baddies from Lake Malawi. *Freshwat. Marine Aquarium* 2: 17 – 23.

LOWE, R.H. 1952. Report on the *Tilapia* and other fish and fisheries of Lake Nyasa, 1945 – 47. *Fishery Publs. colon. Off.* 1: 1 – 126.

LOWE, R.H. 1953. Notes on the ecology and evolution of Nyasa fishes of the genus *Tilapia*, with a description of *T. saka* Lowe. *Proc. zool. Soc. Lond.* 122: 1035 – 1041.

LOWE-McCONNELL, R.H. 1959. Breeding behaviour patterns and ecological differences between *Tilapia* species and their significance for evolution within the genus *Tilapia* (Pisces: Cichlidae). *Proc. zool. Soc. Lond.* 132: 1 – 130.

LOWE-McCONNELL, R.H. 1969. Speciation in tropical freshwater fishes. *Biol. J. Linn. Soc.* I. 51 – 75.

LOWE-McCONNELL, R.H. 1975. Fish communities in tropical freshwaters. Their distribution, ecology and evolution. Longman, London & New York.

MacARTHUR, R.H. 1964. Environmental factors affecting bird species diversity. *Am. Nat.* 98: 387 – 398.

MARLIER, G. 1959. Observations sur la biologie littorale du lac Tanganyika. *Revue Zool. Bot. afr.* 59: 164 – 183.

MARSH, A.C. 1981. A contribution to the ecology and systematics of the genus *Petrotilapia* (Pisces: Cichlidae) in Lake Malawi. MSc. thesis, Rhodes Univ., South Africa.

MARSH, A.C. 1983. A taxonomic study of the fish genus *Petrotilapia* (Pisces: Cichlidae) from Lake Malawi, Part I. *Ichthyol. Bull. Rhodes Univ.* 48: 1 – 14.

MARSH, A.C. & RIBBINK, A.J. 1981. A comparison of the abilities of three species of *Petrotilapia* (Cichlidae, Lake Malawi) to penetrate deep water. *Envir. Biol. Fishes* 6: 367 – 369.

MARSH, A.C., RIBBINK, A.J. & MARSH, B.A. 1981. Sibling species complexes in sympatric populations of *Petrotilapia* Trewavas (Cichlidae, Lake Malawi). *Zool. J. Linn. Soc.* 71: 253 – 264.

MATTHES, H. 1962. Poissons nouveaux ou interessants du lac Tanganyika et du Ruande. *Annls Mus. r. Afr. cent. Zool.* 3: 27 – 88.

MAYR, E. 1942. Animal species and evolution. Univ. Press, Harvard.

MAYR, E. 1963. Animal species and evolution. Univ. Press, Harvard.

MAYR, E. 1969. Principles of systematic zoology. McGraw Hill, New York.

McKAYE, K.R. 1980. Seasonality in habitat selection by the gold colour morph of *Cichlasoma citrinellum* and its relevance to sympatric speciation in the family Cichlidae. *Envir. Biol. Fishes* 5: 75 – 78.

McKAYE, K.R. & MARSH, A.C. 1983. Food switching by two specialized algae-scraping cichlid fishes in Lake Malawi, Africa. *Oecologia.* 56: 245 – 248.

NOBLE, G.K. & CURTIS, B. 1939. The social behaviour of the jewel fish, *Hemichromis bimaculatus* Gill. *Bull. Am. Mus. nat. Hist.* 76: 1 – 46.

OLIVER, M.K. 1975. *Labidochromis textilus*, a new cichlid fish (Teleostei: Cichlidae) from Lake Malawi. *Proc. biol. Soc. Wash.* 88: 319 – 330.

PATERSON, H.E. 1978. More evidence against speciation by reinforcement. *S. Afr. J. Sci.* 74: 369 – 371.

PATERSON, H.E. 1980. A comment on 'mate recognition systems'. *Evolution* 34: 330 – 331.

PIKE, J.G. & RIMMINGTON, G.T. 1965. Malawi. A geographical study. Oxford Univ. Press.

REGAN, C.T. 1921. The cichlid fishes of Lake Nyasa. *Proc. zool. Soc. Lond.* 1921: 675 – 727.

REGAN, C.T. 1922. The cichlid fishes of Lake Victoria. *Proc. zool. Soc. Lond.* 1922: 157 – 191.

RIBBINK, A.J. 1971. The behaviour of *Hemihaplochromis philander*, a South African cichlid fish. *Zool. afr.* 6: 263 – 288.

RIBBINK, A.J. 1980. The ornamental fish project. A report and recommendations. Internal Rep. Fish. Dept. Minist. For. Nat. Resources, Malawi.

RIBBINK, A.J. In press. The feeding behaviour of a cleaner, scale, skin and fin eater of Lake Malawi (*Docimodus evelynae*, Pisces, Cichlidae). *Neth. J. Zool.*

RIBBINK, A.J., MARSH, A.C., MARSH, B. & SHARP, B.J. 1980. Parental behaviour and mixed broods among cichlid fish of Lake Malawi. *S. Afr. J. Zool.* 15: 1 – 6.

RIBBINK, A.J. & LEWIS, D.S.C. 1982. *Melanochromis crabro* sp. nov.: a cichlid fish from Lake Malawi which feeds on ectoparasites and catfish eggs. *Neth. J. Zool.* 32: 72 – 87.

RIBBINK, A.J., MARSH, A.C., MARSH, B.A. & SHARP, B.J. In press. The zoogeography, ecology and taxonomy of the genus *Labeotropheus* Ahl 1927 (Pisces: Cichlidae) of Lake Malawi. *Zool. J. Linn. Soc.*

RICARDO-BERTRAM, C.K., BORLEY, H.J.H. & TREWAVAS, E. 1942. Report on the fish and fisheries of Lake Nyasa. Crown Agents, London.

SALE, P.F. 1977. Maintenance of high diversity in coral reef fish communities. *Am. Nat.* 111: 337 – 359.

SHARP. B.J. 1981. An ecological study of territoriality in four cichlid species resident on rocky shores near Monkey Bay, Lake Malawi. MSc. thesis, Rhodes Univ., South Africa.

SLOBODKIN, L.B. & FISHELSON, L. 1974. The effect of the cleaner-fish *Labroides dimidiatus* on the point diversity of fishes on the reef front at Eilat. *Am. Nat.* 98: 387 – 398.

SMITH, C.L. & TYLER, J.C. 1973. Direct observations of resource sharing in coral reef fish. *Helgoländer Wiss. Meeresunters.* 24: 264 – 275.

STAECK, W. 1977. Cichliden Verbreitung, Verhalten, Arten. Band II. Engelbert Pfriem-Verlag, Wuppertal-Elberfield.

STIASSNY, M.L.J. 1980. Phylogenetic versus convergent relationship between piscivorous cichlid fishes from Lakes Malawi and Tanganyika. *Bull. Br. Mus. nat. Hist. (Zool.)* 40: 67 – 101.

STOCK, A.D. 1976. The taxonomic status of *Labidochromis joanjohnsonae* Johnson, *Labidochromis fryeri* Oliver and *Melanochromis exasperatus* Burgess. *Buntbarsche Bull.* 55: 14 – 19.

TREWAVAS, E. 1931. Revision of the cichlid fishes of the genus *Lethrinops* Regan. *Ann. Mag. nat. Hist.* (10) 7: 133 – 152.

TREWAVAS, E. 1935. A synopsis of the cichlid fishes of Lake Nyasa. *Ann. Mag. nat. Hist.* (10) 16: 65 – 118.

TREWAVAS, E. 1973. I. On the cichlid fishes of the genus *Pelmatochromis* with proposal of a new genus for *P. congicus;* on the relationship between *Pelmatochromis* and *Tilapia* and the recognition of *Sarotherodon* as a distinct genus and species. II. A new species of cichlid fishes of rivers Quanza and Bengo, Angola, with a list of the known Cichlidae of these rivers and a note on *Pseudocrenilabrus natalensis* Fowler. *Bull. Br. Mus. nat. Hist. (Zool.).* 25: 1 – 37.

TREWAVAS, E., GREEN, J. & CORBET, S.A. 1972. Ecological studies on crater lakes in West Cameroon. Fishes of Barombi Mbo. *J. Zool.* 167: 41 – 95.

TURNER, J.L. 1977a. Some effects of demersal trawling in Lake Malawi (Lake Nyasa) from 1968 to 1974. *J. Fish Biol.* 10: 261 – 271.

TURNER, J.L. 1977b. Changes in the size structure of cichlid populations of Lake Malawi resulting from bottom trawling. *J. Fish. Res. Bd Can.* 34: 232 – 238.

VAN OIJEN, M.J.P., WITTE, F. & WITTE-MAAS, E.L.M. 1981. An introduction to ecological and taxonomic investigations on the haplochromine cichlids from Mwanza Gulf of Lake Victoria. *Neth. J. Zool.* 31: 149 – 174.

VRBA, E.S. 1980. Evolution, species and fossils: How does life evolve? *S. Afr. J. Sci.* 76: 61 – 84.

WELCOMME, R. 1972. The inland waters of Africa. *F.A.O. CIFA Tech. Pap.* 1: 1 – 117.

WICKLER, W. 1962. Zur Stammesgeschichte funktionell korrelierter Organ-und Verhaltensmerkmale: Ei-Attrappen und Maulbrüten bei afrikanischen Cichliden. *Z. Tierpsychol.* 19: 129 – 164.

WICKLER, W. 1963. Zur Klassifikation der Cichlidae, am Beispiel der Gattungen *Tropheus, Petrochromis, Haplochromis* und *Hemihaplochromis* n. gen. *Senckenberg. biol.* 44: 83 – 96.

WORTHINGTON, E.B. 1954. Speciation of fishes in African lakes. *Nature, Lond.* 173: 1064 – 1067.

YAMAOKA, K. 1982. Morphology and feeding behaviour of five species of genus *Petrochromis* (Teleostei, Cichlidae) *Physiol. Ecol. Japan* 19: 57 – 75.