

Canadian Technical Report of  
Fisheries and Aquatic Sciences 1951

1994

A BIBLIOGRAPHY OF MARKING FISHES WITH TETRACYCLINES  
INCLUDING REFERENCES TO EFFECTS ON FISHES

by

R.J. Wastle, J.A. Babaluk and G.M. Decterow

Central and Arctic Region

Department of Fisheries and Oceans

Winnipeg, Manitoba R3T 2N6

This is the 58th Technical Report  
from the Central and Arctic Region, Winnipeg

© Minister of Supply and Services Canada 1994

Cat. no. Fs 97-4/1951E      ISSN 0706-6457

Correct citation for this publication is:

Wastle, R.J., J.A. Babaluk, and G.M. Dectorow. 1994. A bibliography of marking fishes with teracyclines including references to effects on fishes. Can. Tech. Rep. Fish. Aquat. Sci. 1951: iv + 26 p.

## TABLE OF CONTENTS

	<u>Page</u>
ABSTRACT/RÉSUMÉ .....	iv
INTRODUCTION .....	1
FORMAT .....	1
Author index .....	1
Taxonomic index .....	1
Subject index .....	1
NOTES ON USING THE INDICES .....	1
CONCLUSION .....	1
ACKNOWLEDGMENTS .....	2
REFERENCES .....	2
AUTHOR INDEX .....	2
Appendix .....	19
TAXONOMIC INDEX .....	19
SUBJECT INDEX .....	23

**ABSTRACT**

Wastle, R.J., J.A. Babaluk, and G.M. Decterow. 1994. A bibliography of marking fishes with tetracyclines including references to effects on fishes. Can. Tech. Rep. Fish. Aquat. Sci. 1951: iv + 26 p.

A list of 368 references published between 1951 and 1993 is presented. The bibliography proper is in alphabetical order by author. Taxonomic and subject indices are also given.

Key words: bibliographies; tetracycline

**RÉSUMÉ**

Wastle, R.J., J.A. Babaluk, and G.M. Decterow. 1994. A bibliography of marking fishes with tetracyclines including references to effects on fishes. Can. Tech. Rep. Fish. Aquat. Sci. 1951: iv + 26 p.

On présente une liste de 368 références parues entre 1951 et 1993. La bibliographie elle-même est présentée par ordre alphabétique des noms des auteurs. Elle contient aussi un index taxonomique et un index des sujets.

Mots-clés: bibliographies; tetracycline

## INTRODUCTION

The marking of fish with fluorescent compounds such as tetracyclines by way of injection, immersion or ingestion has become an accepted and important technique in fisheries research and management (Muncy et al. 1990). Fish are marked with tetracyclines for purposes of age validation, assessment of growth, assessment of stocking success, etc. The literature available on the subject (tetracycline marking including effects on fish) is at a point where we feel it should be published in bibliographic form so that fisheries researchers and managers who are planning to use tetracycline in their work will have a readily available listing of pertinent references.

The 368 references in this bibliography were published between 1951 and 1993 and were obtained by searching for "tetracycline" (Achromycin), "oxytetracycline" (Terramycin) and "chlortetracycline" (Aureomycin) linked with numerous fisheries related key words or phrases (e.g. age validation) on a variety of data bases including Aquatic Sciences and Fisheries Abstracts, PolTox and Biological Abstracts. Other references came from the Department of Fisheries and Oceans database (WAVES), periodicals and other publications received by the Freshwater Institute Library. References cited in these works were, also, checked against references on file or against those held in the Freshwater Institute Library. Whenever possible, original references were checked for accuracy, but as some were not available, there may be errors in some citations.

The bibliography was compiled using the Ref-11 software package and downloaded in Word Perfect from which camera-ready copy was produced.

## FORMAT

The format used is similar to that used by Marshall (1981) where the bibliography is divided into three sections: author, taxonomic and subject indices. References are numbered in the author index so that citations in subsequent indices are by number and refer users back to the author index for complete citations.

### 1. Author Index

References are numbered and listed in alphabetical order by author. Works by the same author are arranged by year of publication, the oldest being listed first. Papers written in cooperation with others are listed after those by the senior author alone and then in alphabetical order by second author. There are no cross references from junior authors. Where an author (or authors) has more than one publication in the same year, a, b, etc. has been used to distinguish between them.

This index is the bibliography proper. As far as

possible the title of the paper in the language in which it is written is given following the year of publication. Translations are enclosed in brackets [ ]. Accents and other diacritical marks have been omitted.

Abbreviations for journal titles have been made according to the Serial Sources for the BIOSIS Previews Data Base (1992). Those journals not listed in this work have been abbreviated following the same format except in those cases where it has not been possible to identify for certain the full title of the journal in question. In this case, the abbreviation has been given in the form found.

### 2. Taxonomic Index

This lists, in alphabetical order, the various genera and species which have been used by authors in studies involving tetracyclines. Where possible changes to genera and species names have been taken into account. For example, users searching for reference to *Lepidopsetta bilineata*, rock sole, will be referred to the current scientific name *Pleuronectes biliniatus* (American Fisheries Society 1991).

### 3. Subject Index

The alphabetized subject headings in this report were chosen from key words present in the title, abstract and/or text of the references.

Since many of the references have not been seen in original form, indexing has been based on the information given by the citing source. It is, therefore, probable that information is present in some papers on subjects not indicated in the indices.

## NOTES ON USING THE INDICES

For the benefit of those users not familiar with the types of indices provided, these notes may be useful.

To locate references, for example, on age validation methods for spiny dogfish, *Squalus acanthias*, compare the list of reference numbers under the heading "*Squalus acanthias*" in the taxonomic index with those under "age validation" in the subject index. Those reference numbers which occur in both lists are potentially relevant. To find the full bibliographic details look up the reference numbers in the author index.

## CONCLUSION

This bibliography, of course, is not complete. Manuscripts relating to the subject have been published while the bibliography was in preparation and some references to published manuscripts have been inadvertently excluded. An update (perhaps in five

years) may be published as sufficient references are collected. It would be appreciated if authors would forward details of any references that have been omitted as well as corrected references to the following address:

J.A. Babaluk  
Fisheries Research Biologist  
Department of Fisheries and Oceans  
Freshwater Institute  
501 University Crescent  
Winnipeg, Manitoba R3T 2N6  
Canada

#### ACKNOWLEDGMENTS

We thank J. Martin (Freshwater Institute Library) for providing assistance during the initial stages of preparing the bibliography. Some of the French and German titles were translated by F. Saurette and E. Scherer, respectively. M. Layton and D. Chiperzak reviewed the bibliography.

#### REFERENCES

- AMERICAN FISHERIES SOCIETY. 1991. Common and scientific names of fishes from the United States and Canada. 5th edition. American Fisheries Society, Bethesda, MD. Am. Fish. Soc. Spec. Publ. 20.
- MARSHALL, K.E. 1981. A bibliography of the Arctic charr, *Salvelinus alpinus* (L.) complex to 1980. Can. Tech. Rep. Fish. Aquat. Sci. 1004: iv + 68 p.
- Muncy, R.J., N.C. Parker, and H.A. Poston. 1990. Inorganic chemical marks induced in fish, pp. 541-546. In N.C. Parker, A.E. Giorgi, R.C. Heidinger, D.B. Jester Jr., E.D. Prince, and G.A. Winans (ed.) Fish-marking techniques. American Fisheries Society, Bethesda, MD. Am. Fish. Soc. Symp. 7.
- SERIAL SOURCES FOR THE BIOSIS PREVIEWS DATA BASE. 1992. BIOSIS, Philadelphia, PA. 434 p.
- AUTHOR INDEX
1. Agasoester, T., and K.E. Rasmussen. 1992. On-line dialysis, liquid chromatography and post-column reaction detection of oxytetracycline in salmon muscle extracts. *J. Pharm. Biomed. Anal.* 10(5): 349-354.
  2. Ahmad, T.S., and A.J. Matty. 1989. The effect of feeding antibiotics on growth and body composition of carp (*Cyprinus carpio*). *Aquaculture* 77(2-3): 211-220.
  3. Alcobendas, M., F. Lecomte, J. Castanet, F.J. Meunier, P. Maire, and M. Holl. 1991. Technique de marquage en masse de civelles (*Anguilla anguilla* L.) par balnéation rapide dans le fluorochrome. Application au marquage à la tétracycline de 500 kg de civelles. [Massal labelling of elvers (*Anguilla anguilla* L.) with fast balneation in fluorochromes. Application to tetracycline labelling of 500 kg of elvers]. *Bull. Fr. Peche Piscic.* 321: 43-54. [In French, English abstract]
  4. Alcobendas, M., F. Lecomte, H. Francillon-Vieillot, J. Castanet, and F.J. Meunier. 1992. Marquage vital en masse chez l'anguille (*Anguilla anguilla* L.) à l'aide d'une technique de balnéation rapide. [Vital mass labelling of glass-eels (*Anguilla anguilla* L.) with fast balneation], pp. 93-101. In J.-L. Bagliniere, J. Castanet, F. Conand, and F.J. Meunier (ed.) *Tissus durs et age individuel des vertebres: Colloq. Natl. ORSTOM/INRA; Bondy (France): 4-6 Mar 1991*. [Hard tissues and individual age of vertebrates]. [In French, English abstract]
  5. Alhossaini, M., and T.J. Pitcher. 1988. The relation between daily rings, body growth and environmental factors in plaice, *Pleuronectes platessa* L., juvenile otoliths. *J. Fish Biol.* 33: 409-418.
  6. Anderson, D.P., W.B. van Muiswinkel, and B.S. Roberson. 1984. Effects of chemical induced immune modulation on infectious diseases of fish, pp. 187-211. In M. Kende, J. Gainer, and M.A. Chirigos (ed.) *Chemical regulation of immunity in veterinary medicine: proceedings of a symposium held in Bethesda, Maryland, September 19-20, 1983*. Alan R. Liss Inc., New York, NY.
  7. Anhalt, G. 1977. Rueckstaende antibakterieller therapeutika bei suesswasserfischen. [Residues of antibiotics in freshwater fish]. *Ber. Landwirtsch.* 55(4): 848-854. [In German, English summary]
  8. Antoine, L., P. Cayre, and J. Mendoza. 1982. Etude de la croissance du listao de l'Atlantique au moyen des rayons de la nageoire dorsale. Mise au point d'une méthodologie--résultats préliminaires. [Study on the skipjack (*Katsuwonus pelamis*) growth in the Atlantic using dorsal fin ray sections. Determination of a methodology--preliminary results]. *Collect. Vol. Sci. Pap. ICCAT* 17(1): 195-208. [In French, English abstract]
  9. Antoine, L., and J. Mendoza. 1986. L'utilisation du rayon de la nageoire dorsale pour l'étude de la croissance et l'écologie du listao. [Utilization of dorsal fin spines in the study of growth and ecology of the skipjack], pp. 317-324. In P.E.K. Symons, P.M.

- Miyake, and G.T. Sakagawa (ed.) Proceedings of the ICCAT Conference on the International Skipjack Year Program. The Commission, Madrid, Spain. [In French, English abstract]
10. Arnold, D.E. 1966. Marking fish with dyes and other chemicals. U.S. Bur. Sport Fish. Wildl. Tech. Pap. 10: 44 p.
11. Asplund, K., and J. Hirn. 1985. Detection of oxytetracycline from farmed fish. Suom. Elainlaakaril. 91(3): 115-120. [In Finnish, English summary]
12. Babaluk, J.A., and J.S. Campbell. 1987. Preliminary results of tetracycline labelling for validating annual growth increments in opercula of walleyes. N. Am. J. Fish. Manage. 7: 138-141.
13. Babaluk, J.A., and J.F. Craig. 1990. Tetracycline marking studies with pike, *Esox lucius* L. Aquacult. Fish. Manage. 21: 307-315.
14. Bagenal, T.B., and F.W. Tesch. 1978. Age and growth, pp. 101-136. In T. Bagenal (ed.) Methods for assessment of fish production in fresh waters. (3rd edition). Blackwell Scientific Publications, Oxford, England. (IBP (Int. Biol. Programme) Handb. 3).
15. Baillon, N., and E. Morize. 1992. Test sur la nature periodique des microstries d'otolithes de teleosteens: methodologie et application a quatre especes recifales corallienes. [Testing periodical formation of unit growth increments in otoliths of tropical juvenile and adult fishes by tetracycline tagging], pp. 53-58. In J.-L. Bagliniere, J. Castanet, F. Conand, and F.J. Meunier (ed.) Tissus durs et age individuel des vertebres; Colloq. Natl. ORSTOM/INRA; Bondy (France); 4-6 Mar 1991. [Hard tissues and individual age of vertebrates]. [In French, English abstract]
16. Beamish, F.W.H., and T.E. Medland. 1988. Age determination for lampreys. Trans. Am. Fish. Soc. 117: 63-71.
17. Beamish, R.J., and D.E. Chilton. 1982. Preliminary evaluation of a method to determine the age of sablefish (*Anoplopoma fimbria*). Can. J. Fish. Aquat. Sci. 39: 277-287.
18. Beamish, R.J., C. Houle, and R. Scarsbrook. 1980. A summary of sablefish tagging and biological studies conducted during 1979 by the Pacific Biological Station. Can. Manusc. Rep. Fish. Aquat. Sci. 1588: iv + 194 p.
19. Beamish, R.J., C. Houle, C. Wood, and R. Scarsbrook. 1979. A summary of sablefish tagging and exploratory trapping studies conducted during 1978 by the Pacific Biological Station. Can. Data Rep. Fish. Aquat. Sci. 162: iv + 113 p.
20. Beamish, R.J., and G.A. McFarlane. 1983a. Summary of results of the Canadian sablefish tagging program, pp. 147-183. In Proceedings of the International Sablefish Symposium, March 29-31, 1983, Anchorage, Alaska. Alaska Sea Grant College Program, University of Alaska, Anchorage, AK. Alaska Sea Grant Rep. 83(8).
21. Beamish, R.J., and G.A. McFarlane. 1983b. Validation of age determination estimates: the forgotten requirement, pp. 29-33. In E.D. Prince and L.M. Pulos (ed.) Proceedings of the International Workshop on Age Determination of Oceanic Pelagic Fishes: Tunas, Billfishes, and Sharks, Miami, Florida, February 15-18, 1982. U.S. Department of Commerce, Seattle, WA. NOAA (Natl Oceanic Atmos. Adm.) Tech. Rep. NMFS (Natl Mar. Fish. Serv.) 8.
22. Beamish, R.J., and G.A. McFarlane. 1983c. The forgotten requirement for age validation in fisheries biology. Trans. Am. Fish. Soc. 112(6): 735-743.
23. Beamish, R.J., and G.A. McFarlane. 1985. Annulus development on the second dorsal spine of the spiny dogfish (*Squalus acanthias*) and its validity for age determination. Can. J. Fish. Aquat. Sci. 42(11): 1799-1805.
24. Beamish, R.J., and G.A. McFarlane. 1987. Current trends in age determination methodology, pp. 15-42. In R.C. Summerfelt and G.E. Hall (ed.) The age and growth of fish. Iowa State University Press, Ames, IA.
25. Beamish, R.J., G.A. McFarlane, and D.E. Chilton. 1983. Use of oxytetracycline and other methods to validate a method of age determination for sablefish, pp. 95-116. In Proceedings of the International Sablefish Symposium, March 29-31, 1983, Anchorage, Alaska. Alaska Sea Grant College Program, University of Alaska, Anchorage, AK. Alaska Sea Grant Rep. 83(8).
26. Beamish, R.J., G.A. McFarlane, R. Scarsbrook, D. Chilton, I. Barber, K. Best, A. Cass, and W. Shaw. 1983. A summary of sablefish tagging and biological studies conducted during 1980 and 1981 by the Pacific Biological Station. Can. Manusc. Rep. Fish. Aquat. Sci. 1732: 135 p.
27. Beamish, R.J., C. Wood, and C. Houle. 1978. A summary of sablefish tagging studies conducted during 1977 by the Pacific Biological Station. Can. Fish. Mar. Serv. Data Rep. 77: iii + 103 p.
28. Beckman, D.W., G.R. Fitzhugh, and C.A. Wilson. 1988. Growth rates and validation of age estimates of red drum, *Sciaenops ocellatus*, in a Louisiana salt marsh impoundment, pp. 93-98. In C.R. Arnold, G.J. Holt, and P. Thomas (ed.) Red drum aquaculture. Proceedings of a Symposium on the Culture of Red

- Drum and other Warm Water Fishes, Corpus Christi, TX (USA), 22-24 June 1987. Marine Science Institute, University of Texas at Austin, Port Aransas, TX. Contrib. Mar. Sci. 30 (Suppl.).
29. Berke, P., A.M. Silver, and H.S. Kupperman. 1953. Effect of aureomycin upon growth and maturation of *Lebiasina reticulatus*. Proc. Soc. Exp. Biol. Med. 84(1): 32-34.
30. Bevelander, G., and R.J. Goss. 1962. Influence of tetracycline on calcification in normal and regenerating teleost scales. Nature 193: 1098-1099.
31. Bilton, H.T. 1986. Marking chum salmon fry vertebrae with oxytetracycline. N. Am. J. Fish. Manage. 6: 126-128.
32. Bilton, H.T., D.W. Jenkinson, and R.M. Humphreys. 1974. Relationship between vertebra diameter and fish length and usefulness of marking vertebra of young coho salmon (*Oncorhynchus kisutch*) with oxytetracycline. Fish. Res. Board Can. Manusc. Rep. Ser. 1308: 7 p.
33. Bingel, F. 1981. An interpretation of the otolith structures of some cod from the central Baltic Sea. Meeresforschung/Reports on Marine Research 29(1): 43-46.
34. Bjorklund, H. 1988. Determination of oxytetracycline in fish by high-performance liquid chromatography. J. Chromatogr. 432: 381-387.
35. Bjorklund, H., J. Bondestam, and G. Bylund. 1990. Residues of oxytetracycline in wild fish and sediments from fish farms. Aquaculture 86(4): 359-367.
36. Bjorklund, H., and G. Bylund. 1990. Temperature-related absorption and excretion of oxytetracycline in rainbow trout (*Salmo gairdneri* R.). Aquaculture 84: 363-372.
37. Bjorklund, H.V., and G. Bylund. 1991. Comparative pharmacokinetics and bioavailability of oxolinic acid and oxytetracycline in rainbow trout (*Oncorhynchus mykiss*). Xenobiotica 21(11): 1511-1520.
38. Bjorklund, H.V., C.M.I. Rabergh, and G. Bylund. 1991. Residues of oxolinic acid and oxytetracycline in fish and sediments from fish farms. Aquaculture 97: 85-96.
39. Blacker, R.W. 1974. Recent advances in otolith studies, pp. 67-90. In F.R. Harden Jones (ed.) Sea fisheries research. Paul Elek (Scientific Books) Ltd., London, England.
40. Blakely, J., J. Kramer, and G.B. Selzer. 1969. Sensitive identity test for chlortetracycline in fish. J. Assoc. Off. Anal. Chem. 52(5): 935-938.
41. Boivin, G. 1971. Contribution à l'étude de la fixation des marqueurs vitaux au cours de l'osteogenèse chez quelques poissons Teleosteens. [Contributions to the study of viable fixation markers during ossification of some teleost fish]. Rapport DEA: 31 p. [In French]
42. Boivin, G., and F.J. Meunier. 1978. Bone formation and fluorescent labelling in teleost fishes, 5 p. In Symposium "Tissues Calcifies des Poissons", Brest, France, 12-13 Mai 1978.
43. Boujard, T., and F.J. Meunier. 1991. Croissance de l'épine pectorale, histologie osseuse et dimorphisme sexuel chez l'atipa, *Hoplosternum littorale* Hancock, 1828 (Callichthyidae, Siluriforme). [Growth of the pectoral spiny ray, bony histology and sexual dimorphism in atipa, *Hoplosternum littorale* Hancock, 1828 (Callichthyidae, Siluriforme)]. Cybium 15(1): 55-68. [In French, English abstract]
44. Branstetter, S. 1987. Age and growth validation of newborn sharks held in laboratory aquaria, with comments on the life history of the Atlantic sharpnose shark, *Rhizoprionodon terraenovae*. Copeia 1987(2): 291-300.
45. Branstetter, S., and J.D. McEachran. 1986. Age and growth of four carcarhinid sharks common to the Gulf of Mexico: a summary paper, pp. 361-371. In T. Uyeno, R. Arai, T. Taniuchi, and K. Matsuura (ed.) Indo-Pacific fish biology. Proceedings of the Second International Conference on Indo-Pacific Fishes, Tokyo National Museum, Ueno Park, Tokyo, July 29-August 3, 1985. Ichthyological Society of Japan, Tokyo, Japan.
46. Brothers, E. 1985. Otolith marking techniques for the early life history stages of lake trout. Gt Lakes Fish. Comm. Res. Compl. Rep.
47. Brothers, E.B. 1983. Summary of round table discussions on age validation, pp. 35-44. In E.D. Prince and L.M. Pulos (ed.) Proceedings of the International Workshop on Age Determination of Oceanic Pelagic Fishes: Tunas, Billfishes, and Sharks, Miami, Florida, February 15-18, 1982. U.S. Department of Commerce, Seattle, WA. NOAA (Natl Oceanic Atmos. Adm.) Tech. Rep. NMFS (Natl Mar. Fish. Serv.) 8.
48. Brothers, E.B. 1987. Methodological approaches to the examination of otoliths in aging studies, pp. 319-330. In R.C. Summerfelt and G.E. Hall (ed.) The age and growth of fish. Iowa State University Press, Ames, IA.
49. Brothers, E.B. 1990. Otolith marking, pp. 183-202. In N.C. Parker, A.E. Giorgi, R.C. Heidinger,

- D.B. Jester Jr., E.D. Prince, and G.A. Winans (ed.) Fish-marking techniques. American Fisheries Society, Bethesda, MD. Am. Fish. Soc. Symp. 7.
50. Brown, C.A., and S.H. Gruber. 1988. Age assessment of the lemon shark, *Negaprion brevirostris*, using tetracycline validated vertebral centra. Copeia 1988(3): 747-753.
51. Bruno, D.W. 1989. An investigation into oxytetracycline residues in Atlantic salmon, *Salmo salar* L. J. Fish Dis. 12(2): 77-86.
52. Bullock, L.H., M.D. Murphy, M.F. Godcharles, and M.E. Mitchell. 1992. Age, growth, and reproduction of jewfish *Epinephelus itajara* in the eastern Gulf of Mexico. U.S. Natl Mar. Fish. Serv. Fish. Bull. 90(2): 243-249.
53. Bumguardner, B.W. 1991. Marking subadult red drums with oxytetracycline. Trans. Am. Fish. Soc. 120: 537-540.
54. Buxton, C.D., and J.C. Allen. 1989. Mark and recapture studies of two sparids in the Tsitsikamma Coastal National Park. Koedoe 32(1): 39-45.
55. Caillart, B., and E. Morize. 1989. Etude du rythme de dépôt des microstries sur les otolithes d'un Serranide tropical, *Epinephelus microdon* (Bleeker), à l'aide d'un marqueur fluorescent: l'oxytetracycline. [Study of the frequency of increment formation on the otoliths of a tropical Serranidae, *Epinephelus microdon* (Bleeker), using a fluorescent marker: oxytetracycline]. Aquat. Living Resour. 2(4): 255-261. [In French, English abstract]
56. Cailliet, G.M. 1990. Elasmobranch age determination and verification: an updated review, pp. 157-165. In H.L. Pratt Jr., S.H. Gruber, and T. Taniuchi (ed.) Elasmobranchs as living resources: advances in the biology, ecology, systematics, and the status of the fisheries. Proceedings of the Second United States-Japan Workshop, Honolulu, Hawaii, 9-14 December 1987. U.S. Department of Commerce, Seattle, WA. NOAA (Natl Oceanic Atmos. Adm.) Tech. Rep. NMFS (Natl Mar. Fish. Serv.) 90.
57. Cailliet, G.M., R.L. Radtke, and B.A. Welden. 1986. Elasmobranch age determination and verification: a review, pp. 345-360. In T. Uyeno, R. Arai, T. Taniuchi, and K. Matsuura (ed.) Indo-Pacific fish biology. Proceedings of the Second International Conference on Indo-Pacific Fishes, Tokyo National Museum, Ueno Park, Tokyo, July 29-August 3, 1985. Ichthyological Society of Japan, Tokyo, Japan.
58. Cailliet, G.M., S. Uchida, W. Laurendine, and J. Brennan. 1986. Structure and growth zone formation of vertebral centra from captive Okinawan whale sharks (*Rhincodon typus*). (Abstr. unpubl. pap., Victoria, B.C.). [Avail. from author, Moss Landing Mar. Lab., P.O. Box 450, Moss Landing, CA 95039]
59. Campana, S.E. 1983. Feeding periodicity and the production of daily growth increments in otoliths of steelhead trout (*Salmo gairdneri*) and starry flounder (*Platichthys stellatus*). Can. J. Zool. 61: 1591-1597.
60. Campana, S.E., and J.D. Neilson. 1982. Daily growth increments in otoliths of starry flounder (*Platichthys stellatus*) and the influence of some environmental variables in their production. Can. J. Fish. Aquat. Sci. 39(7): 937-942.
61. Campana, S.E., and J.D. Neilson. 1985. Microstructure of fish otoliths. Can. J. Fish. Aquat. Sci. 42: 1014-1032.
62. Campbell, E.A., and D.L. Johnson. 1989. Intraperitoneal injection and hyperosmotic infiltration for administering antibiotic to largemouth bass. Prog. Fish-Cult. 51(1): 29-33.
63. Carrier, J.C., and R. Radtke. 1988. Preliminary evaluation of age and growth in juvenile nurse sharks (*Ginglymostoma cirratum*) using visual and electron microprobe assessment of tetracycline-labelled vertebral centra. (Abstr. unpubl. pap., Ann Arbor, MI 49224). [Avail. from author, Biol. Dep., Albion Coll., Albion, MI]
64. Carter, E.W., D.A. Nagtegaal, and B.M. Leaman. 1982. Rockfish tagging off southwest Vancouver Island and off northwest Washington, M/V Sun Maiden May 3-17, 1982. Can. Data Rep. Fish. Aquat. Sci. 349: 54 p.
65. Cass, A.J., and R.J. Beamish. 1983. First evidence of validity of the fin-ray method of age determination for marine fishes. N. Am. J. Fish. Manage. 3: 182-188.
66. Cass, A.J., R.J. Beamish, and G.A. McFarlane. 1990. Lingcod (*Ophiodon elongatus*). Can. Spec. Publ. Fish. Aquat. Sci. 109: iv + 40 p.
67. Cass, A.J., E. Cameron, and I. Barber. 1983. Lingcod tagging study off southwest Vancouver Island, M/V Pacific Eagle - July 14-27, 1982. Can. Data Rep. Fish. Aquat. Sci. 406: 88 p.
68. Cass, A.J., G.A. McFarlane, K. Rutherford, and I. Barber. 1984. Lingcod tagging study in the Strait of Georgia, November 1982 - March 1983. Can. Manusc. Rep. Fish. Aquat. Sci. 1791: vi + 49 p.
69. Cass, A.J., M.S. Smith, I. Barber, and K. Rinhofer. 1983. A summary of lingcod tagging studies conducted in 1978 by the Pacific Biological Station.

- Can. Data Rep. Fish. Aquat. Sci. 417: iv + 283 p.
70. Casselman, J.M. 1974. Analysis of hard tissue of pike *Esox lucius* L. with special reference to age and growth, pp. 13-27. In T.B. Bagena (ed.) Aging of fish - the proceedings of an international symposium. Unwin Brothers Ltd., Old Woking, Surrey, England.
71. Casselman, J.M. 1978. Calcified tissue and body growth of northern pike, *Esox lucius* Linnaeus. Ph.D. thesis, University of Toronto, Toronto, ON. 782 p. [2 volumes]
72. Casselman, J.M. 1983. Age and growth assessment of fish from their calcified structures - techniques and tools, pp. 1-17. In E.D. Prince and L.M. Pulos (ed.) Proceedings of the International Workshop on Age Determination of Oceanic Pelagic Fishes: Tunas, Billfishes, And Sharks, Miami, Florida, February 15-18, 1982. U.S. Department of Commerce, Seattle, WA. NOAA (Natl Oceanic Atmos. Adm.) Tech. Rep. NMFS (Natl Mar. Fish. Serv.) 8.
73. Casselman, J.M. 1987. Determination of age and growth, pp. 209-242. In A.H. Weatherley and H.S. Gill (ed.) The biology of fish growth. Academic Press, London, England.
74. Casselman, J.M. 1990. Growth and relative size of calcified structures of fish. Trans. Am. Fish. Soc. 119(4): 673-688.
75. Chadwick, H.K. 1966. Fish marking, pp. 18-40. In A. Calhoun (ed.) Inland fisheries management. California Department of Fish and Game, Sacramento, CA.
76. Chart, T.E., and E.P. Bergersen. 1988. Methods for long-term identification of salmonids: a review. U.S. Fish Wildl. Serv. Biol. Rep. 88(37): 1-18.
77. Chikova, V. 1992. [Antibiotic residues in fish]. Khranitelna Promishlenost 40(2): 32-33. [In Bulgarian]
78. Chilton, D.E., and R.J. Beamish. 1982. Age determination methods for fishes studied by the Groundfish Program at the Pacific Biological Station. Can. Spec. Publ. Fish. Aquat. Sci. 60: 102 p.
79. Choate, J.C. 1964. Use of tetracycline drugs to mark advanced fry and fingerling brook trout (*Salvelinus fontinalis*). Trans. Am. Fish. Soc. 93: 309-311.
80. Clay, D. 1990. Tagging demersal marine fish in subzero temperatures along the Canadian Atlantic coast, pp. 147-151. In N.C. Parker, A.E. Giorgi, R.C. Heidinger, D.B. Jester Jr., E.D. Prince, and G.A. Winans (ed.) Fish-marking techniques. American Fisheries Society, Bethesda, MD. Am. Fish. Soc. Symp. 7.
81. Cravedi, J.-P., G. Choubert, and G. Delous. 1987. Digestability of chloramphenicol, oxolinic acid and oxytetracycline in rainbow trout and influence of these antibiotics on lipid digestibility. Aquaculture 60(2): 133-141.
82. Dabrowski, K., and K. Tsukamoto. 1986. Tetracycline tagging in coregonid embryos and larvae. J. Fish Biol. 29: 691-698.
83. De Bont, A.F., and R. van Coillie. 1965. Facteurs physiologiques determinant la formation des annuli dans les écailles: scalimétrie à l'aide des tétracyclines. [Physiological factors affecting the formation of scale annuli: scale reading using tetracycline]. 16eme Congr. Int. Limnol. Pologne. [In French]
84. De Bont, A.F., and R. van Coillie. 1966. Scalimétrie à l'aide des tétracyclines. [Scale reading using tetracycline]. Int. Assoc. Theor. Appl. Limnol. Proc. 16(2): 1130-1134. [In French, English summary]
85. DeCew, M.G. 1972. Antibiotic toxicity, efficacy, and teratogenicity in adult spring chinook salmon (*Oncorhynchus tshawytscha*). J. Fish. Res. Board Can. 29(11): 1513-1517.
86. Dee, A.J., and R.L. Radtke. 1989. Age and growth of the brick soldierfish, *Myripristis amaena*. Coral Reefs 8(2): 79-85.
87. Dekker, W. 1986. Age reading of European eels using tetracycline labelled otoliths. Int. Counc. Expl. Sea Council Meeting M:16: 14 p.
88. Earp, B.J., C.H. Ellis, and E.J. Ordal. 1953. Kidney disease in young salmon. Wash. Dep. Fish. Spec. Rep. Ser. no. 1.
89. Einvindvik, K., and K.E. Rasmussen. 1989. Determination of oxytetracycline in fish plasma by high-performance liquid chromatography and column-switching. J. Liq. Chromatogr. 12(15): 3061-3071.
90. Emery, L., and R. Wydoski. 1987. Marking and tagging of aquatic animals: an indexed bibliography. U.S. Fish Wildl. Serv. Resour. Publ. 165: 57 p.
91. Engelhardt, ?, and H. Mann. 1955. Futterungsversuche mit antibiotica (Aureomycin und Penicillin) an regenbogenforellen. [Experiments on feeding antibiotics (Aureomycin and Penicillin) to rainbow trout]. Fischwirt 5(9). [In German]
92. Everhart, W.H., A.W. Eipper, and W.D. Youngs. 1975. Fish marking, pp. 141-164. In Principles of fishery science. Cornell University Press, Ithaca, NY.

93. Fanelli, G.M., Jr., and R.F. Nigrelli. 1963. Renal excretion of tetracycline in the aglomerular toadfish, *Opsanus tau* Proc. Exp. Biol. Med. 114: 582-584.
94. Fargo, J., and D.E. Chilton. 1987. Age validation for rock sole in Hecate Strait, British Columbia. Trans. Am. Fish. Soc. 116(5): 776-778.
95. Fargo, J., R.P. Foucher, S.C. Shields, and D. Ross. 1984. English sole tagging in Hecate Strait, R/V G.B. Reed, June 6-24, 1983. Can. Data Rep. Fish. Aquat. Sci. 427: iii + 52 p.
96. Fargo, J., and S.J. Westrheim. 1987. Results, through 1985, of the rock sole (*Lepidopsetta bilineata*) tagging experiments in Hecate Strait (British Columbia) during April-May 1982 with regard to stock delineation. Can. Manusc. Rep. Fish. Aquat. Sci. 1912: iii + 51 p.
97. Farrington, W.H.H., J. Tarbin, J. Bygrave, and G. Shearer. 1991. Analysis of trace residues of tetracyclines in animal tissues and fluids using metal chelate affinity chromatography/HPLC. Food Addit. Contam. 8(1): 55-64.
98. Ferreira, B.P., and G.R. Russ. 1992. Age, growth and mortality of the inshore coral trout *Plectropomus maculatus* (Pisces: Serranidae) from the central Great Barrier Reef, Australia. Aust. J. Mar. Freshwater Res. 43(5): 1301-1312.
99. Ferrell, D.J., G.W. Henry, J.D. Bell, and N. Quartararo. 1992. Validation of annual marks in the otoliths of young snapper, *Pagrus auratus*. Aust. J. Mar. Freshwater Res. 43(5): 1051-1055.
100. Foreman, T. 1987. A method of simultaneously tagging large oceanic fish and injecting them with tetracycline. U.S. Natl Mar. Fish. Serv. Fish. Bull. 85(3): 645-647.
101. Fowler, A.J. 1989. Description, interpretation and use of the microstructure of otoliths from juvenile butterflyfishes (family Chaetodontidae). Mar. Biol. 102(2): 167-181.
102. Fowler, A.J. 1990. Validation of annual growth increments in the otoliths of a small, tropical coral reef fish. Mar. Ecol. Prog. Ser. 64(1-2): 25-38.
103. Fowler, A.J., and P.J. Doherty. 1992. Validation of annual growth increments in the otoliths of two species of damselfish from the southern Great Barrier Reef. Aust. J. Mar. Freshwater Res. 43(5): 1057-1068.
104. Francis, R.I.C.C., L.J. Paul, and K.P. Mulligan. 1992. Ageing of adult snapper (*Pagrus auratus*) from otolith annual ring counts: validation by tagging and oxytetracycline injection. Aust. J. Mar. Freshwater Res. 43(5): 1069-1089.
105. Fraser, F.J., D.D. Bailey, and M.J. Wood. 1978. Big Qualicum River Salmon Development Project (Vol. III): experimental rearing of chum salmon juveniles (*Oncorhynchus keta*) in fresh water (1968-70). Can. Fish. Mar. Serv. Tech. Rep. 752: vii + 22 p.
106. Fribourgh, J.H., J.A. Robinson, and F.P. Meyer. 1969a. Oxytetracycline residues in tissues of blue and channel catfishes. U.S. Bur. Sport Fish. Wildl. Tech. Pap. 38: 7 p.
107. Fribourgh, J.H., J.A. Robinson, and F.P. Meyer. 1969b. Oxytetracycline levels produced in catfish serum by three methods of treatment. U.S. Bur. Sport Fish. Wildl. Tech. Pap. 39: 6 p.
108. Frieser, V.J., W. Gedek, and H. Dangschat. 1986. Ausscheidung von chlortetracyclin bei regenbogenforellen. [Detection of chlortetracycline in rainbow trout]. Dtsch. Tierarztl. Wochenschr. 93(10): 491-492. [In German, English abstract]
109. Gallahar, N.K., and M.J. Kingsford. 1992. Patterns of increment width and strontium: calcium ratios in otoliths of juvenile rock blackfish, *Girella elevata* (M.). J. Fish Biol. 41(4): 749-763.
110. Gauldie, R.W., and D.G.A. Nelson. 1990. Otolith growth in fishes. Comp. Biochem. Physiol. 97A(2): 119-135.
111. Geffen, A.J. 1987. Methods of validating daily increment deposition in otoliths of larval fish, pp. 223-240. In R.C. Summerfelt and G.E. Hall (ed.) The age and growth of fish. Iowa State University Press, Ames, IA.
112. Geffen, A.J. 1992. Validation of otolith increment deposition rate, pp. 101-113. In D.K. Stevenson and S.E. Campana (ed.) Otolith microstructure examination and analysis. Canada Communication Group - Publishing, Ottawa, ON. Can. Spec. Publ. Fish. Aquat. Sci. 117.
113. Gleason, T.R., and C. Recksiek. 1990. Preliminary field verification of daily growth increments in the lapillar otoliths of juvenile cunners, pp. 562-565. In N.C. Parker, A.E. Giorgi, R.C. Heidinger, D.B. Jester Jr., E.D. Prince, and G.A. Winans (ed.) Fish-marking techniques. American Fisheries Society, Bethesda, MD. Am. Fish. Soc. Symp. 7.
114. Glende, W.-H. 1972. Untersuchungen über die antibiotikaverweildauer und den antibiotikagehalt in der muskulatur, leber, galle und im blut von regenbogenforellen (*Salmo gairdneri*) nach peroraler verabreichung verschiedener chlortetracyclin-

- (aureomycin-)dosen. [Investigations on duration of retention and concentration of antibiotics in muscle, liver, gall and blood of rainbow trout (*Salmo gairdneri*) after peroral treatment with different dosages of chlortetracycline (aureomycin)]. Diss. Tierarztl. Hochschule Hannover. [In German]
115. Goss, R.J. 1961. Metabolic antagonists and prolonged survival of scale homografts in *Fundulus heteroclitus*. Biol. Bull. 121(1): 162-172.
116. Goss, R.J. 1962. Analysis of homograft reactions in *Fundulus heteroclitus*. Bull. Mt Desert Isl. Biol. Lab. 4.
117. Groman, D., D. Tweedie, and D. Shaw. 1992. Experiences with atypical furunculosis in Newfoundland: an overview. Bull. Aquacult. Assoc. Can. 92-1:36-39.
118. Grondel, J.L., and H.J.A.M. Boesten. 1982. The influence of antibiotics on the immune system 1. Inhibition of the mitogenic leukocyte response in vitro by oxytetracycline, pp. 211-216. In W.B. van Muiswinkel and E.L. Cooper (ed.) Immunology and immunization of fish. Conference, June 22-24, 1981, Wageningen, The Netherlands. Pergamon Press Ltd., Elmsford, NY. Dev. Comp. Immunol. 2 (Suppl.).
119. Grondel, J.L., A.G.M. Gloudemans, and W.B. van Muiswinkel. 1985. The influence of antibiotics on the immune system: II. Modulation of fish leukocyte responses in culture. Vet. Immunol. Immunopathol. 9(3): 251-260.
120. Grondel, J.L., J.F.M. Nouws, M. de Jong, A.R. Schutte, and F. Driessens. 1987. Pharmacokinetics and tissue distribution of oxytetracycline in carp, *Cyprinus carpio* L., following different routes of administration. J. Fish Dis. 10(3): 153-163.
121. Grondel, J.L., J.F.M. Nouws, and W.B. van Muiswinkel. 1987. The influence of antibiotics on the immune system: immuno-pharmacokinetic investigations on the primary anti-SRBC response in carp, *Cyprinus carpio* L., after oxytetracycline injection. J. Fish Dis. 10(1): 35-43.
122. Gruber, S.H. 1982. Role of the lemon shark, *Negaprion brevirostris* (Poey) as a predator in the tropical marine environment: a multidisciplinary study. Fla Sci. 45(1): 46-75.
123. Gruber, S.H., and R.G. Stout. 1983. Biological materials for the study of age and growth in a tropical marine elasmobranch, the lemon shark, *Negaprion brevirostris* (Poey), pp. 193-205. In E.D. Prince and L.M. Pulos (ed.) Proceedings of the International Workshop on Age Determination of Oceanic Pelagic Fishes: Tunas, Billfishes, and Sharks, Miami, Florida, February 15-18, 1982. U.S. Department of Commerce, Seattle, WA. NOAA (Natl Oceanic Atmos. Adm.) Tech. Rep. NMFS (Natl Mar. Fish. Serv.) 8.
124. Hall, D.L. 1991. Age validation and aging methods for stunted brook trout. Trans. Am. Fish. Soc. 120: 644-649.
125. Harling, W.R., R.P. Foucher, and M.W. Saunders. 1982. Rock sole tagging in Hecate Strait, April 27 - May 11, 1982. Can. Data Rep. Fish. Aquat. Sci. 355: iii + 57 p.
126. Hartmann, S., A. Friedrich, F. Baum, and L. Goetze. 1990. [Drug residues in food fish]. DTW (Dtsch. Tierarztl. Wochenschr.) 97(7): 293-296. [In German, English abstract]
127. Hawke, J.P., S.M. Plakas, R.V. Minton, R.M. McPhearson, T.G. Snider, and A.M. Guarino. 1987. Fish pasteurellosis of cultured striped bass (*Morone saxatilis*) in coastal Alabama. Aquaculture 65(3-4): 193-204.
128. Hendricks, M.L., T.R. Bender Jr., and V.A. Mudrak. 1991. Multiple marking of American shad otoliths with tetracycline antibiotics. N. Am. J. Fish. Manage. 11(2): 212-219.
129. Herald, E.S., R.P. Dempster, and H. McCully. 1954. The effect of aurofac- enriched diet (aureomycin and B12) upon young king salmon. Calif. Fish Game 40(4): 415-421.
130. Herman, R.L. 1969a. Oxytetracycline in fish culture - a review. U.S. Bur. Sport Fish. Wildl. Tech. Pap. 31: 9 p.
131. Herman, R.L. 1969b. Oxytetracycline toxicity to trout. U.S. Bur. Sport Fish. Wildl. Tech. Pap. 33: 4 p.
132. Herman, R.L., D. Collis, and G.L. Bullock. 1969. Oxytetracycline residues in different tissues of trout. U.S. Bur. Sport Fish. Wildl. Tech. Pap. 37: 6 p.
133. Hettler, W.F. 1984. Marking otoliths by immersion of marine fish larvae in tetracycline. Trans. Am. Fish. Soc. 113(3): 370-373.
134. Hillman, R.E., and C.E. Werme. 1983. Review and evaluation of fish marking techniques. Final Report to the New York Power Authority, White Plains, New York.
135. Hoedt, F.E. 1992a. Validation of daily growth increments in otoliths from *Thryssa aestuaria* (Ogilby), a tropical anchovy from northern Australia. Aust. J. Mar. Freshwater Res. 43(5): 1043-1050.
136. Hoedt, F.E. 1992b. Age and growth of a large tropical anchovy, *Thryssa hamiltoni* (Gray): a

- comparison of ageing techniques. Aust. J. Mar. Freshwater Res. 43(5): 953-971.
137. Holden, M.J., and M.R. Vince. 1973. Age validation studies on the centra of *Raja clavata* using tetracycline. J. Cons. Cons. Int. Explor. Mer 35(1): 13-17.
138. Horie, M., Y. Hoshino, N. Nose, H. Iwasaki, and H. Nakazawa. 1985. Simultaneous determination of antibiotics and synthetic antibacterials in fish by high performance liquid chromatography. Eisei Kagaku [J. Hyg. Chem.] 31(6): 371-376. [In Japanese, English abstract]
139. Hu, D.M. 1988. The use of oxytetracycline in farmed finfish in seawater: a paper for industry. Intraqua Data Management Ltd., North Vancouver, BC. 30 p. + app.
140. Hurley, P., and T.D. Iles. 1980. Report of the Canadian research program on large pelagic fishes. Collect. Vol. Sci. Pap. ICCAT 9(3): 601-605.
141. Hustvedt, S.O., T. Storebakken, and R. Salte. 1991. Does oral administration of oxolinic acid or oxytetracycline affect feed intake of rainbow trout? Aquaculture 92(2-3): 109-113.
142. Ikeda, Y. 1969. [Effects of iodine potassium on the growth of the scale of goldfish]. Gyorinken-kenpo [Bull. Fish Scale Res. Lab.] 3: 28-55. [In Japanese]
143. Ingebrigtsen, K., I. Nafstad, and A. Maritim. 1985. The distribution of <sup>3</sup>H-tetracycline after a single oral dose in the rainbow trout (*Salmo gairdneri*) as observed by whole body autoradiography. Acta Vet. Scand. 26: 428-430.
144. Inter-American Tropical Tuna Commission. 1974. Inter-Am. Trop. Tuna Comm. Annu. Rep. 1973: 150 p.
145. Inter-American Tropical Tuna Commission. 1976. Inter-Am. Trop. Tuna Comm. Annu. Rep. 1975: 176 p.
146. Inter-American Tropical Tuna Commission. 1977. Inter-Am. Trop. Tuna Comm. Annu. Rep. 1976: 180 p.
147. Inter-American Tropical Tuna Commission. 1978. Inter-Am. Trop. Tuna Comm. Annu. Rep. 1977: 155 p.
148. Inter-American Tropical Tuna Commission. 1979. Inter-Am. Trop. Tuna Comm. Annu. Rep. 1978: 163 p.
149. Inter-American Tropical Tuna Commission. 1980. Inter-Am. Trop. Tuna Comm. Annu. Rep. 1979: 227 p.
150. Inter-American Tropical Tuna Commission. 1981. Inter-Am. Trop. Tuna Comm. Annu. Rep. 1980: 234 p.
151. Inter-American Tropical Tuna Commission. 1982. Inter-Am. Trop. Tuna Comm. Annu. Rep. 1981: 303 p.
152. Iversen, B., A. Aanesrud, A.K. Kolstad, and K.E. Rasmussen. 1989. Determination of oxytetracycline in plasma from rainbow trout using high-performance liquid chromatography with ultraviolet detection. J. Chromatogr. 493: 217-221.
153. Jacobsen, M.D. 1989. Withdrawal times of freshwater rainbow trout, *Salmo gairdneri* Richardson, after treatment with oxolinic acid, oxytetracycline and trimetoprim. J. Fish Dis. 12(1): 29-36.
154. Jensen, A.C., and K.B. Cumming. 1967. Use of lead compounds and tetracycline to mark scales and otoliths of marine fishes. Prog. Fish-Cult. 29(3): 166-167.
155. Jinbo, K., R. Momose, T. Maruyama, and M. Matsumoto. 1988. [An improvement in the microbial detection method for tetracycline residues in farmed fish]. Annual Report of Tokyo Metropolitan Research Laboratory of Public Health no. 39: 108-111. [In Japanese]
156. Jones, B.W., and B.C. Bedford. 1968. Tetracycline labelling as an aid to interpretation of otolith structures in age determination - a progress report. Int. Counc. Expl. Sea Council Meeting Gen:11: 1-3.
157. Jones, I. 1965. Tetracycline marking and thermal brand studies. 16th Annu. Northwest Fish Culturists Conf.: A65-66.
158. Jones, I.W. 1969. Notes on marking salmon fingerlings with tetracycline. Oreg. Fish. Comm. Annu. Progr. Rep.: 6 p.
159. Jones, I.W., and R. Steel. 1965. Tetracycline salmon marking studies. Oregon Fish Comm. Annu. Progr. Rep. Contract 14-17-0001-1004: 17 p.
160. Jones, I.W., and D.F. Swartz. 1966. Tetracycline salmon marking studies. Oregon Fish Comm. Annu. Progr. Rep. Contract 14-17-0001-1269: 23 p.
161. Jones, R. 1979. Materials and methods used in marking experiments in fishery research. FAO Fish. Tech. Pap. 190: 134 p.

162. Kalish, J.M. 1989. Otolith microchemistry: validation of the effects of physiology, age and environment on otolith composition. *J. Exp. Mar. Biol. Ecol.* 132: 151-178.
163. Kayle, K.A. 1992. Use of oxytetracycline to determine the contribution of stocked fingerling walleyes. *N. Am. J. Fish. Manage.* 12(2): 353-355.
164. Keck, G., C. Martell, and J.P. Gerard. 1984. Pharmacologie des poissons. Etude pharmacologique de l'oxytetracycline (OTC) chez la truite arc-en-ciel-consequences therapeutiques et hygieniques - influence d'une enzyme proteolytique (Fradiase ND). [Fish pharmacology. A pharmacokinetics study of oxytetracycline (OTC) in rainbow trout. Therapeutic and hygienic consequences. Influence of a proteolytic enzyme (Fradiase ND)]. *Rev. Med. Vet.* 135(4): 217-228. [In French, English abstract]
165. Kincheloe, J.W. 1963. The effect of the disinfectant additive (anti-germ 77) in Pfizer poultry formula terramycin on three species of salmonids. *Prog. Fish-Cult.* 25(1): 40-41.
166. Kingsford, M.J., and M.J. Milicich. 1987. Presettlement phase of *Parika scaber* (Pisces: Monacanthidae): a temperate reef fish. *Mar. Ecol. Prog. Ser.* 36: 65-79.
167. Kirk, P.D., K.L. Drummond, and M. Ryan. 1988. Preliminary stock size analysis: Tasman Bay/Golden Bay snapper tagging programme. New Zealand Ministry of Agriculture and Fisheries, Fisheries Assessment Research Document No. 88/44.
168. Kobayashi, S., R. Yuki, T. Furui, and T. Kosugiyama. 1964. Calcification in fish and shellfish - I. Tetracycline labelling patterns on scale, centrum and otolith in young goldfish. *Bull. Jpn. Soc. Sci. Fish.* 30(1): 6-13.
169. Koenings, J.P., J. Lipton, and P. McKay. 1986. Quantitative determination of oxytetracycline uptake and release by juvenile sockeye salmon. *Trans. Am. Fish. Soc.* 115: 621-629.
170. Korneeva, L.A. 1963. [Application of fodder terramycin in feeding the carp with artificial fodder]. *Tr. Vser. Nauchno-Issled. Inst. Prud. Rybn. Khoz.* 12:139-147. [In Russian]
171. Korneeva, L.A. 1965. [The effect of fodder terramycin on the growth of the carp reared in nurseries]. *Tr. Vser. Nauchno-Issled. Inst. Prud. Rybn. Khoz.* 13: 93-96. [In Russian]
172. Kou, G.-H. 1984. Immunosuppressive effects of oxytetracycline in eel. 1. Effects on agglutinin formation. *COA Fish. Ser.* 1: 1-5. [In Chinese, English abstract]
173. Kreutzmann, H.-L. 1977. The effects of chloramphenicol and oxytetracycline on haematopoiesis in the European eel (*Anguilla anguilla*). *Aquaculture* 10: 323-334.
174. Kreutzmann, H.-L. 1978. Vergleichende untersuchungen von blutbildveraenderungen der fische nach pharmakaapplikation. [Comparative investigations on haematoma changes in fishes after drug application]. *Fisch.-Forsch.* 16: 55-57. [In German]
175. Kushner, D.I., S.E. Smith, and G.M. Cailliet. 1992. Validated age and growth of the leopard shark, *Triakis semifasciata*, with comments on reproduction. *Environ. Biol. Fishes* 35(2): 187-203.
176. Kusser, W.C., and S.G. Newman. 1990. Detection of oxytetracycline residues in fish tissues using a sensitive bioassay. *J. Fish Dis.* 13(6): 545-548.
177. Laine, A.O., W.T. Momot, and P.A. Ryan. 1991. Accuracy of using scales and cleithra for aging northern pike from an oligotrophic Ontario lake. *N. Am. J. Fish. Manage.* 11(2): 220-225.
178. Laird, L.M. and B. Stott. 1978. Marking and tagging, pp. 84-100. In T. Baggenal (ed.) *Methods for assessment of fish production in fresh waters*. (3rd edition). Blackwell Scientific Publications, Oxford, England. (IBP (Int. Biol. Programme) Handb. 3).
179. Lanzing, W.J.R., and J.S. Hynd. 1966. Tetracycline distribution in body tissues of marine fishes. *Aust. J. Sci.* 29: 177-178.
180. Laurs, R.M., R. Nishimoto, and J.A. Wetherall. 1985. Frequency of increment formation on sagittae of North Pacific albacore (*Thunnus alalunga*). *Can. J. Fish. Aquat. Sci.* 42: 1552-1555.
181. Leaman, B.M., and D.A. Nagtegaal. 1987. Age validation and revised natural mortality rate for yellowtail rockfish. *Trans. Am. Fish. Soc.* 116(2): 171-175.
182. Liu, C.-K., and C.-H. Wang. 1978. Toxicological studies of some drugs in cultured eels (*Anguilla japonica*). *JCRR Fish. Ser.* no. 34: 33-43. [In Chinese, English abstract].
183. Liu, C.-K. and C.-H. Wang. 1987. Toxicological studies of some drugs in cultured eels (*Anguilla japonica*), pp. 83-93. In K.-S. Kou, J.-L. Wu, Y.-L. Hsu, S.-N. Chen, M.-C. Tung, I.-C. Liao, and H.-Y. Chung (ed.) *The memoir of virology and pharmacology in fish disease*. 3. Council of Agriculture, Taipei, Taiwan. COA Fish. Ser. no. 12. [In Chinese, English abstract].

184. Liu, C.-K., and T.-Y. Yen. 1984. Tissue levels of oxytetracycline in cultured eels after continuous oral administration. COA Fish. Ser. 1: 79-83. [In Chinese, English abstract]
185. Ljungberg, O., L. Silven, and N. Johanssen. 1969. Residues of sulphamerazine and terramycin in artificially fed rainbow trout. Proc. 5th Symp. World Assoc. Vet. Hyg.: 565-570.
186. Long, A.R., L.S. Hsieh, M.S. Malbrough, C.R. Short, and S.A. Barker. 1990. Matrix solid phase dispersion isolation and liquid chromatographic determination of oxytetracycline in catfish (*Ictalurus punctatus*) muscle tissue. J. Assoc. Off. Anal. Chem. 73: 864-867.
187. Lopez, E. 1970. L'os cellulaire d'un poisson teleosteen (*Anguilla anguilla* L.). I. Etude histocytologique et histophysique. [Cellular bone tissue from a teleostean fish (*Anguilla anguilla* L.). I. A histocytological and histophysical study]. Z. Zellforsch. Mikrosk. Anat. 109: 552-565. [In French, English Abstract]
188. Lorson, R.D., and V.A. Mudrak. 1987. Use of tetracycline to mark otoliths of American shad fry. N. Am. J. Fish. Manage. 7(3): 453-455.
189. Lou, D.C. 1992. Validation of annual growth bands in the otolith of tropical parrotfishes (*Scarus schlegeli* Bleeker). J. Fish Biol. 41: 775-790.
190. Lou, D.C., and N.A. Moltschanivskyj. 1992. Daily otolith increments in juvenile tropical parrotfishes and surgeonfishes. Aust. J. Mar. Freshwater Res. 43(5): 973-981.
191. Luer, C., and G.M. Cailliet. Studies on OTC uptake and captive growth in the skate, *Raja eglanteria*. (Research in progress as of Dec. 1987). [Inf. avail. from junior author, Moss Landing Mar. Lab., P.O. Box 450, Moss Landing, CA 95039]
192. Mahajan, C.L., and K.P. Sharma. 1976. Studies on the effect of some vitamins and antibiotics on the survival and growth of carps in the first few weeks of their life. J. Inland Fish. Soc. India 8: 194-199.
193. Marking, L.L., G.E. Howe, and J.R. Crowther. 1988. Toxicity of erythromycin, oxytetracycline, and tetracycline administered to lake trout in water baths, by injection, or by feeding. Prog. Fish-Cult. 50(4): 197-201.
194. McCracken, A., S. Fidgeon, J.J. O'Brien, and D. Anderson. 1976. An investigation of antibiotic and drug residues in fish. J. Appl. Bact. 40: 61-66.
195. McFarlane, G.A., and R.J. Beamish. 1987a. Validation of the dorsal spine method of age determination for spiny dogfish, pp. 287-300. In R.C. Summerfelt and G.E. Hall (ed.) The age and growth of fish. Iowa State University Press, Ames, IA.
196. McFarlane, G.A., and R.J. Beamish. 1987b. Selection of dosages of oxytetracycline for age validation studies. Can. J. Fish. Aquat. Sci. 44: 905-909.
197. McFarlane, G.A., R.J. Beamish, M.S. Smith, V. Egan, and D. Brown. 1982. Results of spiny dogfish tagging in the Strait of Georgia, Queen Charlotte Sound, Hecate Strait and Dixon Entrance during 1980. Can. Manusc. Rep. Fish. Aquat. Sci. 1646: iv + 123 p.
198. McMichael, R.H., Jr., and K.M. Peters. 1989. Early life history of spotted seatrout, *Cynoscion nebulosus* (Pisces: Sciaenidae), in Tampa Bay, Florida. Estuaries 12(2): 98-110.
199. Medland, T.E., and F.W.H. Beamish. 1987. Age validation for the mountain brook lamprey, *Ichthyomyzon greeleyi*. Can. J. Fish. Aquat. Sci. 44: 901-904.
200. Medland, T.E., and F.W.H. Beamish. 1991. Lamprey statolith banding patterns in response to temperature, photoperiod, and ontogeny. Trans. Am. Fish. Soc. 120(2): 255-260.
201. Meunier, F. 1972. Marquages simples et multiples du tissu osseux de quelques Teleosteens par des substances fluorescentes. [Single and multiple marking of bone tissue using fluorescent substances on certain teleosts]. C.R. Acad. Sci. Paris Ser. D 275: 1685-1688. [In French]
202. Meunier, F. 1973. La technique du marquage vital des tissus osseux chez les poissons. [Viable marking techniques of bone tissue of fish]. Journees d'Ichthyologie de l'EDF, Loire sur Rhone. [In French]
203. Meunier, F. 1974. La technique de marquage vital des tissus squelettiques des poissons. [Viable marking techniques of skeletal tissues of fish]. Bull. Fr. Piscic. 255: 51-57. [In French]
204. Meunier, F., and G. Boivin. 1972. Marquages multiples du tissu osseux de quelques teleosteens a l'aide de plusieurs fluorochromes. [Multiple marking of bone tissue of some teleosts using several fluorescent markers]. Bull. Soc. Zool. Fr. 97(3): 38-39. [In French]
205. Meunier, F., and G. Boivin. 1974. Divers aspects de la fixation du chlorhydrate de tetracycline sur les tissus squelettiques de quelques Teleosteens. [Notes on the fixation of skeletal tissues using hydrochloric tetracycline on teleostean fish]. Bull. Soc. Zool. Fr.

- 99(3): 495-504. [In French, English summary]
206. Meunier, F.J. 1982. Etude experimentale de l'excretion de la tetracycline chez la carpe, *Cyprinus carpio* L. (Cyprinidae, Teleostei). Resultats preliminaries. [Experimental study of the tetracycline excretion from the carp, *Cyprinus carpio* L. (Cyprinidae, Teleostei). Preliminary results]. Cybium (3E Ser.) 6(1): 53-64. [In French, English abstract]
207. Meunier, F.J., and G. Boivin. 1978. Action de la fluoresceine, de l'alizarine, du bleu de calceine et de diverses doses de tetracycline sur la croissance de la truite et de la carpe. [Action of fluorescent markers on growth of trout and carp. Effects of different doses of fluorescein, alizarin, calcein blue and tetracycline]. Ann. Biol. Anim. Biochim. Biophys. 18(6): 1293-1308. [In French, English abstract]
208. Meunier, F.J., and M. Pascal. 1981. Etude experimentale de la croissance cyclique des rayons de nageoire de la carpe (*Cyprinus carpio* L.). Resultats preliminaires. [Experimental study of cyclical growth in fin rays of carp (*Cyprinus carpio* L.). Preliminary results]. Aquaculture 26(1-2): 23-40. [In French, English abstract]
209. Michel, C. 1986. Practical value, potential dangers and methods of using antibacterial drugs in fish. Rev. Sci. Tech. O.I.E. (Off. Int. Epizoot.) 5(3): 659-675.
210. Mishra, B.K., D. Kumar, and R.K. Dey. 1988. Combined prophylactic drug treatment and balanced diet in rearing fry of the Indian major carp, *Labeo rohita*. Asian Fish. Sci. 1(2): 203-206.
211. Mitra, R., and S.C. Ghosh. 1967. The effect of terramycin on the growth of some freshwater food fishes: *Labeo rohita*, *Catla catla* and *Cirrhinus mrigala*. Proc. Natl Acad. Sci. India Sect. B 37(iv): 406-408.
212. Molony, B.W., and J.H. Choat. 1990. Otolith increment widths and somatic growth rate: the presence of a time-lag. J. Fish Biol. 37: 541-551.
213. Moring, J.R., and C.W. Fay. 1984. Identification of U.S. stocks in non-U.S. waters: non-tag marking techniques. Prepared for U.S. Department of Commerce. NOAA (Natl Oceanic Atmos. Adm.) NMFS (Natl Mar. Fish. Serv.), Woods Hole, MA. 84 p.
214. Moser, M., J. Sakanari, and G. Cailliet. 1986. Vital stain in bait as a tag. N. Am. J. Fish. Manage. 6: 600-601.
215. Mugiya, Y. 1977. Effect of acetazolamide on the otolith growth of goldfish. Bull. Jpn. Soc. Sci. Fish. 43(9): 1053-1058.
216. Mugiya, Y. 1990. Long-term effects of hypophysectomy on the growth and calcification of otoliths and scales in the goldfish, *Carassius auratus*. Zool. Sci. 7(2): 273-279.
217. Mugiya, Y., T. Hakomori, and K. Hatsutori. 1991. Trace metal incorporation into otoliths and scales in the goldfish, *Carassius auratus*. Comp. Biochem. Physiol. 99C(3): 327-331.
218. Mugiya, Y., and J. Muramatsu. 1982. Time-marking methods for scanning electron microscopy in goldfish otoliths. Bull. Jpn. Soc. Sci. Fish. 48(9): 1225-1232.
219. Muller, W. 1956. Über die perspektiven der antibiotika-verfutterung in der teichwirtschaft. [On the perspectives of feeding antibiotics in the practice of pond aquaculture]. Dtsch. Fisch. Ztg 3(4): 110-115. [In German]
220. Muncy, R.J., N.C. Parker, and H.A. Poston. 1990. Inorganic chemical marks induced in fish, pp. 541-546. In N.C. Parker, A.E. Giorgi, R.C. Heidinger, D.B. Jester Jr., E.D. Prince, and G.A. Winans (ed.) Fish-marking techniques. American Fisheries Society, Bethesda, MD. Am. Fish. Soc. Symp. 7.
221. Murphy, M.D., and R.G. Taylor. 1990. Reproduction, growth, and mortality of red drum *Sciaenops ocellatus* in Florida waters. U.S. Natl Mar. Fish. Serv. Fish. Bull. 88(3): 531-542.
222. Murphy, M.D., and R.G. Taylor. 1991. Direct validation of ages determined for adult red drums from otolith sections. Trans. Am. Fish. Soc. 120(2): 267-269.
223. Murray, J., A. MacGill, and R. Hardy. 1988. Development of a method for the determination of oxytetracycline in trout. Food Addit. Contam. 5(1): 77-83.
224. Muth, R.T., and K.R. Bestgen. 1991. Effect of sunlight on tetracycline marks in otoliths of Colorado squawfish larvae. Trans. Am. Fish. Soc. 120: 666-668.
225. Muth, R.T., and T.P. Nesler. 1989. Marking Colorado squawfish embryos and newly hatched larvae with tetracycline. Southwest. Nat. 34: 432-436.
226. Muth, R.T., T.P. Nesler, and A.F. Wasowicz. 1988. Marking cyprinid larvae with tetracycline, pp. 89-95. In R.D. Hoyt (ed.) 11th Annual Larval Fish Conference. American Fisheries Society, Bethesda, MD. Am. Fish. Soc. Symp. 5.
227. Nagiec, C. 1977. Ossification of the axial skeleton and fins in the whitefish, *Coregonus lavaretus* L. Acta Biol. Cracov. Ser. Zool. XX(2): 155-179.

228. Nagiec, C. 1979. On the developmental stages of the fins and axial skeleton in whitefish, *Coregonus lavaretus*. Pol. Arch. Hydrobiol. 26(4): 529-543.
229. Nagiec, M. 1973. Marking of fish with tetracycline antibiotics. (Unpubl. manusc., Institute for Ichthyobiology and Fisheries, Academy of Agriculture and Technology in Olsztyn, Poland).
230. Nagiec, M., K. Dabrowski, C. Nagiec, and E. Murawska. 1988. Mass-marking of coregonid larvae and fry by tetracycline tagging of otoliths. Aquacult. Fish. Manage. 19(2): 171-178.
231. Nagiec, M., and C. Nagiec. 1983. Marking of juvenile whitefish (*Coregonus lavaretus* L.) by tetracycline antibiotics. Roczn. Nauk Roln. Ser. H Rybactwo 100(3): 107-114.
232. Nagiec, M., C. Nagiec, K. Dabrowski, and E. Murawska. 1983. Marking of juvenile whitefish *Coregonus lavaretus* (L.) with tetracycline antibiotics. Acta Ichthyobiol. Pisc. 13(2): 47-57.
233. Nagtegaal, D.A., B.M. Leaman, R. Stanley, and B.J. Westman. 1982. Rockfish tagging cruise in Queen Charlotte Sound, R/V G.B. Reed, July 3-17, 1981. Can. Data Rep. Fish. Aquat. Sci. 326: 45 p.
234. Natanson, L.J. 1984. Aspects of the age, growth, and reproduction of the Pacific angel shark, *Squatina californica*, off Santa Barbara, California. M.A. Thesis, San Jose State University, San Jose, CA. 71 p.
235. Natanson, L.J., and G.M. Cailliet. 1990. Vertebral growth zone deposition in Pacific angel sharks. Copeia 1990(4): 1133-1145.
236. Natanson, L.J., G.M. Cailliet, and B.A. Welden. 1984. Age, growth and reproduction of the Pacific angel shark (*Squatina californica*) from Santa Barbara, California. Amer. Zool. 24(3): 27A. [Abstract only]
237. Neilson, J.D., and G.H. Geen. 1985. Effects of feeding regimes and diel temperature cycles on otolith increment formation in juvenile chinook salmon, *Oncorhynchus tshawytscha*. U.S. Natl Mar. Fish. Serv. Fish. Bull. 83(1): 91-101.
238. Nielsen, J. 1988. A review on marking and tagging methods applied to eel (*Anguilla anguilla* (L.)). EIFAC (Eur. Inland Fish. Advis. Comm.) Occas. Pap. 21 (part 2) : 24 p.
239. Nigrelli, R.F., and J.W. Atz. 1952. Don't be a hypochondriac about your fishes. Aquarium J. 23(10): 201-205.
240. Nordeide, J.T., J.C. Holm, H. Ottera, G. Blom, and A. Borge. 1992. The use of oxytetracycline as a marker for juvenile cod (*Gadus morhua* L.). J. Fish Biol. 41(1): 21-30.
241. Nordeide, J.T., and A.G.V. Salvanes. 1991. Observations on reared newly released and wild cod (*Gadus morhua* L.) and their potential predators. Int. Counc. Explor. Sea Mar. Sci. Symp. 192: 139-146.
242. Norlander, I., H. Johnsson, and B.-G. Osterdahl. 1987. Oxytetracycline residues in rainbow trout analysed by a rapid HPLC method. Food Addit. Contam. 4(3): 291-296.
243. Nusbaum, K.E., and E.B. Shotts. 1981. Absorption of selected antimicrobial drugs from water by channel catfish, *Ictalurus punctatus*. Can. J. Fish. Aquat. Sci. 38(8): 993-996.
244. Occhi de Forrati, R.N. 1971. Application of tetracyclines to the study of growth in freshwater fish. J. Dent. Res. 50(5 pt. 1): 1156. [Abstract only]
245. Odense, P.H., and V.H. Logan. 1974. Marking Atlantic salmon (*Salmo salar*) with oxytetracycline. J. Fish. Res. Board Can. 31(3): 348-350.
246. Onji, Y., M. Uno, and K. Tanigawa. 1984. Liquid chromatographic determination of tetracycline residues in meat and fish. J. Assoc. Off. Anal. Chem. 67(6): 1135-1137.
247. Ouchi, K. 1969. Effects of water temperature on the scale growth and width of the ridge distance in goldfish. Bull. Jpn. Soc. Sci. Fish. 35(1): 25-31.
248. Ozaki, H., H. Yasuda, and Y. Ikeda. 1968. [A study of the growth of the scale of goldfish]. Gyorinken-kenpo [Bull. Fish Scale Res. Lab.] 1: 1-57. [In Japanese]
249. Ozaki, H., H. Yasuda, and Y. Ikeda. 1969. [Effects of siloxene on the growth of the scale of goldfish]. Gyorinken-kenpo [Bull. Fish Scale Res. Lab.] 2: 22-61. [In Japanese]
250. Panfili, J., and M.-C. Ximenes. 1992. Measurements on ground or sectioned otoliths: possibilities of bias. J. Fish Biol. 41(2): 201-207.
251. Panfili, J., M.-C. Ximenes, A.J. Crivelli, and T. Dochi. 1992. Validation de l'age de l'anguille europeenne dans les lagunes mediterraneennes francaises (Camargue): resultats preliminaires. [Age validation of European eel in the French Mediterranean lagoons (Camargue): preliminary results], pp. 119-127. In J.-L. Bagliniere, J. Castanet, F. Conand, and F.J. Meunier (ed.) Tissus durs et age individuel des vertebres; Colloq. Natl. ORSTOM/INRA; Bondy (France); 4-6 Mar 1991. [Hard tissues and individual age of vertebrates]. [In

## French, English abstract]

252. Paragamian, V.L., E.C. Bowles, and B. Hoelscher. 1992. Use of daily growth increments on otoliths to assess stockings of hatchery-reared kokanee. *Trans. Am. Fish. Soc.* 121: 785-791.
253. Parsons, G.R. 1987. Energy budget of the bonnethead shark, *Sphyrna tiburo*. (Abstr. unpubl. pap., Albany, NY). [Avail. from author, Biol. Dep., Univ. Mississippi, University, MS 38677]
254. Parsons, G.R., and K.M. Peters. 1989. Age determination in larval and juvenile sheepshead, *Archosargus probatocephalus*. U.S. Natl Mar. Fish Serv. Fish. Bull. 87(4): 985-988.
255. Pedersen, T., and B. Carlsen. 1991. Marking cod (*Gadus morhua* L.) juveniles with oxytetracycline incorporated into the feed. *Fish. Res. (Amst.)* 12: 57-64.
256. Phillips, A.M., Jr., F.E. Lovelace, D.R. Brockway, and G.C. Balzer Jr. 1952. The nutrition of trout. N.Y. Cons. Dep. Fish. Res. Bull. 16: 46 p. (Cortland Hatchery Report 21)
257. Phillips, A.M., Jr., F.E. Lovelace, D.R. Brockway, and G.C. Balzer Jr. 1953. The nutrition of trout. N.Y. Cons. Dep. Fish. Res. Bull. 17: 31 p. (Cortland Hatchery Report 22)
258. Pike, C.S., and S.H. Gruber. 1988. The use of tetracycline validated vertebral centra in the estimation of age and growth of captive, juvenile lemon sharks (*Negaprion brevirostris*). (Abstr. unpubl. pap., Ann Arbor, MI). [Avail. from junior author, R.S.M.A.S., Univ. Miami, 4600 Rickenbacker Causeway, Miami, FL]
259. Pitcher, C.R. 1988. Validation of a technique for reconstructing daily patterns in the recruitment of coral reef damselfish. *Coral Reefs* 7: 105-111.
260. Radtke, R.L., and T.F. Hourigan. 1990. Age and growth of the Antarctic fish *Nototheniops nudifrons*. U.S. Natl Mar. Fish. Serv. Fish. Bull. 88(3): 557-571.
261. Radtke, R.L., T.E. Targett, A. Kellermann, J.L. Bell, and K.T. Hill. 1989. Antarctic fish growth: profile of *Trematomus newnesi*. *Mar. Ecol. Prog. Ser.* 57(2): 103-117.
262. Ralston, S., and G.T. Miyamoto. 1983. Analyzing the width of daily otolith increments to age the Hawaiian snapper, *Pristipomoides filamentosus*. U.S. Natl Mar. Fish. Serv. Fish. Bull. 81(3): 523-535.
263. Ridgway, G.J., and D.D. Weber. 1962. Marking fish with tetracycline antibiotics. *Proc. West. Assoc. State Game Fish Comm.* 42: 182-183.
264. Rijkers, G.T., A.G. Teunissen, R. Van Oosterom, and W.B. van Muiswinkel. 1980. The immune system of cyprinid fish. The immunosuppressive effect of the antibiotic oxytetracycline in carp (*Cyprinus carpio* L.). *Aquaculture* 19(2): 177-189.
265. Rijkers, G.T., R. van Oosterom, and W.B. van Muiswinkel. 1981. The immune system of cyprinid fish. Oxytetracycline and the regulation of humoral immunity in carp (*Cyprinus carpio* L.). *Vet. Immunol. Immunopathol.* 2(3): 281-290.
266. Rijnsdorf, A.D., and T.A.M. Visser. 1987. Tetracycline labelling of otoliths in plaice. *Int. Counc. Explor. Sea Council Meeting G:33*: 11 p.
267. Rinaldo, R., R. Evans, and P. Vergne. 1981. Preliminary results of the 1980 skipjack tuna tagging cruise in the western Atlantic and Caribbean Sea. *Collect. Vol. Sci. Pap. ICCAT* 15(1): 150-164.
268. Robinson, L.A., M.H. Payne Jr., D.D. Palmer, and R.E. Burrows. 1951. Tests of hatchery foods for blueback salmon 1950. U.S. Fish Wildl. Serv. Spec. Sci. Rep. Fish. 63: 23 p.
269. Rogstad, A., V. Hormazabal, O.F. Ellingsen, and K.E. Rasmussen. 1991. Pharmacokinetic study of oxytetracycline in fish. 1. Absorption, distribution and accumulation in rainbow trout in freshwater. *Aquaculture* 96(3-4): 219-226.
270. Rogstad, A., V. Hormazabal, and M. Yndestad. 1988. Optimization of solid phase extraction of oxytetracycline from fish tissue and its determination by HPLC. *J. Liq. Chromatogr.* 11: 2337-2347.
271. Ruhle, C., and C. Grieder. 1989. Nouvelles methode de marquage vital d'oeufs de Salmonides par incorporation osmotique de tetracycline a la fecondation: experiences preliminaires sur des oeufs de truite fario (*Salmo trutta fario*) et de truites arc-en-ciel (*Oncorhynchus mykiss*). [New method for the marking of trout (*Salmo trutta fario* and *Oncorhynchus mykiss*) eggs by osmotic incorporation of tetracycline at fertilization]. *Bull. Fr. Peche Piscic.* 315: 181-188. [In French, English abstract]
272. Ruhle, C.H., and C. Winecki-Kuhn. 1992. Tetracycline marking of coregonids at the time of egg fertilization. *Aquat. Sci.* 54(2): 165-175.
273. Ryan, J.J., and J.A. Dupont. 1974. Chemical analysis of tetracycline residues in animal tissues. *J. Assoc. Off. Anal. Chem.* 57(4): 828-931.
274. Ryland, J.S., and T.O. Ajayi. 1984. Growth and

- population dynamics of three *Raja* species (Batoidei) in Carmarthen Bay, British Isles. J. Cons. Cons. Int. Explor. Mer 41: 111-120.
275. Sadovy, Y., M. Figuerola, and A. Roman. 1992. Age and growth of red hind *Epinephelus guttatus* in Puerto Rico and St. Thomas. U.S. Natl Mar. Fish. Serv. Fish. Bull. 90(3): 516-528.
276. Salte, R. 1982. Oxytetracycline residues in rainbow trout (*Salmo gairdneri*) fed a commercial medicated feed. Acta Vet. Scand. 23(1): 150-152.
277. Salte, R., and K. Liestoel. 1983. Drug withdrawl from farmed fish. Depletion of oxytetracycline, sulfadiazine, and trimethoprim from muscular tissue of rainbow trout (*Salmo gairdneri*). Acta Vet. Scand. 24(4): 418-430.
278. San Roman, N.A. 1985. Untersuchungen sur histologie und histochemie des feinbaus der teleosteer-schuppen unter besonderer beruecksichtigung von *Tilapia mossambica* Peters (*Sarotherodon* Rueppell 1853). [Investigations on the histology and histochemistry of the fine structure of teleost scales with special regard to *Tilapia mossambica* Peters (*Sarotherodon* Rueppell 1853)]. Mitt. Inst. Seefisch. Bundesforschungsanst. Fisch. Hambg 36: 113 p. [In German, English abstract]
279. Santos Guerra, A., and S. Torres Nunez. 1981. Resultados preliminares del marcaje de listado (*K. pelamis*) en Aguas de Canarias. [Preliminary results of tagging skipjack (*K. pelamis*) in the waters of the Canary Islands]. Collect. Vol. Sci. Pap. ICCAT 15(1): 165-170. [In Spanish, English abstract]
280. Santos, A., and S. Torres. 1983. Resultados preliminares de las campanas de marcado "Listado 7909" y "Listado 8007" en aguas de Canarias. [Preliminary results of the campaigns carried out to tag skipjacks in Canary Islands waters]. Bol. Inst. Esp. Oceanogr. 1(1): 95-99. [In Spanish, English abstract]
281. Saunders, M.W., G.A. McFarlane, and R.J. Beamish. 1990. Factors that affect the recapture of tagged sablefish off the west coast of Canada, pp. 708-713. In N.C. Parker, A.E. Giorgi, R.C. Heidinger, D.B. Jester Jr., E.D. Prince, and G.A. Winans (ed.) Fish-marking techniques. American Fisheries Society, Bethesda, MD. Am. Fish. Soc. Symp. 7.
282. Saunders, M.W., G.A. McFarlane, and M.S. Smith. 1985. Results of spiny dogfish (*Squalus acanthias*) tagging in B.C. waters during 1982 and 1983. Can. Data Rep. Fish. Aquat. Sci. 515: iv + 228 p.
283. Saurette, F. 1992. Growth and survival of the early life history stages of tomcod (*Microgadus tomcod*) in an estuarine nursery zone based on the microstructure of the otoliths. M.Sc. thesis, Laval University, Quebec City, PQ. iv + 57 p.
284. Schaperclaus, V.W. 1958. Bewahrung des chloronitrins in der teichwirtschaftlichen praxis und neue versuche über die anwendbarkeit weiterer breitspektrum-antibiotica bei der bekämpfung der infektiosen bauchwassersucht des karpfens. [Pertaining to chloronitrin in pond aquaculture and new experiments on using other broad-spectrum antibiotics for treating infectious dropsy in carp]. Z. Fisch. Hilfswiss. VII NF. Heft 7/8: 599-628. [In German, English summary]
285. Schmid, A., H. Reichenbach-Klinke, and W. Ahne. 1981. Arzneimittelrueckstaende bei fischen. [Drug residues in fish], pp. 51-61. In Contributions to fish toxicology and fish histology. Gustav Fischer Verlag, Stuttgart, West Germany. [In German, English abstract]
286. Schmitt, P.D. 1984. Marking growth increments in otoliths of larval and juvenile fish by immersion in tetracycline to examine the rate of increment formation. U.S. Natl Mar. Fish. Serv. Fish. Bull. 82: 237-242.
287. Schreiter, T. 1954. Die bedeutung der vitamine fur das wachstum und die gesunderhaltung unserer fische. [The significance of vitamins for growth and maintenance of health of our fishes]. Dtsch. Fisch. Ztg 2: 48. [In German]
288. Schultz, E.T. 1990. Daily otolith increments and the early life history of a viviparous fish, *Micrometrus minimus* (Embiotocidae). Copeia 1990(1): 59-67.
289. Schumacher, R.E. 1953. Results of fortifying standard Minnesota hatchery diet with aureomycin and thiamin hydrochloride on the growth of brown trout. Minn. Dep. Conserv. Div. Game Fish Invest. Rep. 142: 7 p.
290. Schumacher, R.E. 1955. Growth of brown trout fingerlings on a diet fortified with aureomycin and thiamine hydrochloride. Prog. Fish-Cult. 17(3): 123-125.
291. Scidmore, W.J., and D.E. Olson. 1969. Marking walleye fingerlings with oxytetracycline antibiotic. Prog. Fish-Cult. 31: 213-216.
292. Secor, D.H., M.G. White, and J.M. Dean. 1991. Immersion marking of larval and juvenile hatchery-produced striped bass with oxytetracycline. Trans. Am. Fish. Soc. 120(2): 261-266. (and: Errata. 1991. Trans. Am. Fish. Soc. 120: 540)
293. Sen, P.R., and D.K. Chatterjee. 1979. Enhancing production of Indian major carp fry and fingerlings by use of growth-promoting substances, pp.

- 134-140. In T.V.R. Pillay and W.A. Dill (ed.) Advances in aquaculture. Fishing News Books Ltd., Farnham, Surrey, England.
294. Shaw, W., D.A. Nagtegaal, C.P. Archibald, and B.M. Leaman. 1981. Rockfish tagging cruises off southwest Vancouver Island (M/V Ocean King) and off northwest Vancouver Island and in Queen Charlotte Sound (M/V Blue Waters) during 1980. Can. Data Rep. Fish. Aquat. Sci. 288: 133 p.
295. Siegfried, R.C., II, and M.P. Weinstein. 1989. Validation of daily increment deposition in the otoliths of spot (*Leiostomus xanthurus*). Estuaries 12(3): 180-185.
296. Silven, L., N. Johanssen, and O. Ljungberg. 1968. Terramycin and sulphamerazine residues in muscle tissue and interior organs of rainbow trout after oral drug treatment. Bull. Off. Int. Epizoot. 69: 1465-1474.
297. Simmons, D.J., N.B. Simmons, and J.H. Marshall. 1970. The uptake of calcium-45 in the acellular-boned toadfish. Calcif. Tissue Res. 5(3): 206-221.
298. Simoneaux, L.F., and S.M. Warlen. 1987. Occurrence of daily growth increments in otoliths of juvenile Atlantic menhaden, pp. 443-451. In R.C. Summerfelt and G.E. Hall (ed.) The age and growth of fish. The Iowa State University Press, Ames, IA.
299. Skomal, G.B., J.G. Casey, H.L. Pratt Jr., and N.E. Kohler. 1988. Age and growth of the blue shark, *Prionace glauca*, in the North Atlantic. (Abstr. unpubl. pap., Ann Arbor, MI). [Avail. from senior author, State Lobs. Hatch. Res. Stn, P.O. Box 9, Vineyard Haven, MA 02568]
300. Smith, M.S., W.T. Andrews, M.W. Saunders, G.A. McFarlane, and W. Kennedy. 1992. Results of spiny dogfish (*Squalus acanthias*) tagging in B.C. waters 1986-1989. Can. Data Rep. Fish. Aquat. Sci. 885: iv + 35 p.
301. Smith, M.S., G.A. McFarlane, and L.G. Egan. 1983. Results of spiny dogfish (*Squalus acanthias*) tagging in the Strait of Georgia during 1981. Can. Data Rep. Fish. Aquat. Sci. 424: iii + 95 p.
302. Smith, M.S., M.W. Saunders, G.A. McFarlane, and L.G. Egan. 1989. Results of spiny dogfish (*Squalus acanthias*) tagging in B.C. waters during 1984 and 1985. Can. Data Rep. Fish. Aquat. Sci. 778: iv + 213 p.
303. Smith, S.E. 1984. Timing of vertebral-band deposition in tetracycline-injected leopard sharks. Trans. Am. Fish. Soc. 113: 308-313.
304. Smith, S.E., and N.J. Abramson. 1990. Leopard shark *Triakis semifasciata* distribution, mortality rate, yield, and stock replenishment estimates based on a tagging study in San Francisco Bay. U.S. Natl Mar. Fish. Serv. Fish. Bull. 88(2): 371-381.
305. Snieszko, S.F. 1957. Use of antibiotics in the diet of salmonid fishes. Prog. Fish-Cult. 19(2): 81-84.
306. Snieszko, S.F. 1959. Antibiotics in fish diseases and fish nutrition. Antibiot. Chemother. (Washington, DC) 9(9): 541-545.
307. Sogard, S.M. 1991. Interpretation of otolith microstructure in juvenile winter flounder (*Pseudopleuronectes americanus*): ontogenetic development, daily increment validation, and somatic growth relationships. Can. J. Fish. Aquat. Sci. 48: 1862-1871.
308. Speare, P. 1992. A technique for tetracycline injection and tagging billfish. Bull. Mar. Sci. 51(2): 197-203.
309. Stein, H., and E. Mathes. 1989. Markierung von suesswasserfischen. [Marking and tagging of freshwater fish]. Fisch. Teichwirt. 40(7): 198-201. [In German]
310. Stewart, B.D., and G.P. Jenkins. 1991. Daily growth increments in the otoliths of juvenile greenback flounder, *Rhombosolea tapirina* Gunther, 1862. J. Fish Biol. 39: 605-608.
311. Strasdine, G.A., and J.R. McBride. 1979. Serum antibiotic levels in adult sockeye salmon as a function of route of administration. J. Fish Biol. 15: 135-140.
312. Sudekum, A.E., J.D. Parrish, R.L. Radtke, and S. Ralston. 1991. Life history and ecology of large jacks in undisturbed, shallow, oceanic communities. U.S. Natl Mar. Fish. Serv. Fish. Bull. 89(3): 493-513.
313. Sugita, H., M. Fukumoto, H. Koyama, and Y. Deguchi. 1988. Changes in the fecal microflora of goldfish *Carassius auratus* with the oral administration of oxytetracycline. Bull. Jpn. Soc. Sci. Fish. 54(12): 2181-2187.
314. Sukhoverkov, F.M. 1967. The effect of cobalt, vitamins, tissue preparations and antibiotics on carp production, pp. 401-407. In T.V.R. Pillay (ed.) Proceedings of the FAO World Symposium on Warm-water Pond Fish Culture, Rome, Italy, 18-25 May 1966. Food and Agriculture Organization of the United Nations, Rome, Italy. FAO Fish. Rep. 44(3).
315. Swartz, D.F. 1971. The use of oxytetracycline marks in vertebra of adult salmon to determine smolt

- size. Oreg. Fish Comm. Res. Rep. 3: 59-60. [Hatchery Biology Section]
316. Sweatman, J.J., and C.C. Kohler. 1991. Validation of daily otolith increments for young-of-the-year white crappies. N. Am. J. Fish. Manage. 11: 499-503.
317. Szedlmayer, S.T., and K.W. Able. 1992. Validation studies of daily increment formation for larval and juvenile summer flounder, *Paralichthys dentatus*. Can. J. Fish. Aquat. Sci. 49(9): 1856-1862.
318. Szedlmayer, S.T., K.W. Able, J.A. Musick, and M.P. Weinstein. 1991. Are scale circuli deposited daily in juvenile weakfish, *Cynoscion regalis*? Environ. Biol. Fishes 31(1): 87-94.
319. Tanaka, S. 1990. Age and growth studies on the calcified structures of newborn sharks in laboratory aquaria using tetracycline, pp. 189-202. In H.L. Pratt, S.H. Gruber, and T. Taniuchi (ed.) Elasmobranchs as living resources: advances in the biology, ecology, systematics, and the status of the fisheries. Proceedings of the Second United States-Japan Workshop, Honolulu, Hawaii, 9-14 December 1987. U.S. Department of Commerce, Seattle, WA. NOAA (Natl Oceanic Atmos. Adm.) Tech. Rep. NMFS (Natl Mar. Fish. Serv.) 90.
320. Thomas, A.E. 1975. Evaluation of the return of adult chinook salmon to the Abernathy incubation channel. U.S. Natl Mar. Fish. Serv. Fish. Bull. 73(2): 356-359.
321. Thorrold, S.R. 1989. Estimating some early life history parameters in a tropical clupeid, *Herklotisichthys castelnauui*, from daily growth increments in otoliths. U.S. Natl Mar. Fish. Serv. Fish. Bull. 87(1): 73-83.
322. Trebaol, L., H. Francillon-Vieillot, and F.J. Meunier. 1991. Etude de la croissance des mâchoires pharyngiennes chez *Trachinotus teraia* (Carangidae, Perciformes) à l'aide de la technique du marquage vital. [Study of the growth of the pharyngeal jaws of *Trachinotus teraia* (Carangidae, Perciformes) using a vital labelling technique]. Cybium 15(4): 263-270. [In French, English abstract]
323. Trojnar, J.R. 1972. Marking fry with tetracycline. Colo. Div. Game Fish Parks Fish. Res. Rev. 7: 53.
324. Trojnar, J.R. 1973. Marking rainbow trout fry with tetracycline. Prog. Fish-Cult. 35(1): 52-54.
325. Tsukamoto, K. 1985. Mass-marking of ayu eggs and larvae by tetracycline-tagging of otoliths. Bull. Jpn. Soc. Sci. Fish. 51(6): 903-911.
326. Tsukamoto, K. 1988. Otolith tagging of ayu embryo with fluorescent substances. Bull. Jpn. Soc. Sci. Fish. 54(8): 1289-1295.
327. Tsukamoto, K. 1989. Otolith daily increments in the Japanese eel. Bull. Jpn. Soc. Sci. Fish. 55(6): 1017-1021.
328. Tsukamoto, K., and T. Kajihara. 1987. Age determination of ayu with otolith. Bull. Jpn. Soc. Sci. Fish. 53(11): 1985-1997.
329. Tsukamoto, K., Y. Seki, T. Oba, M. Oya, and M. Iwahashi. 1989. Application of otolith to migration study of salmonids. Physiol. Ecol. Jpn Spec. Vol. 1: 119-140.
330. Tsukamoto, K., and Y. Shima. 1990. Otolith daily increment in sandfish. Bull. Jpn. Soc. Sci. Fish. 56(7): 1083-1087.
331. Tsukamoto, K., Y. Shima, and J. Hirokawa. 1991. Estimation of early growth history in the Japanese sandfish with otolith microstructure. Bull. Jpn. Soc. Sci. Fish. 57(4): 585-589.
332. Tucker, R. 1985. Age validation studies on the spines of the spurdog (*Squalus acanthias*) using tetracycline. J. Mar. Biol. Assoc. U.K. 65(3): 641-651.
333. Tzeng, W.-N., and S.-Y. Yu. 1989. Validation of daily growth increments in otoliths of milkfish larvae by oxytetracycline labelling. Trans. Am. Fish. Soc. 118(2): 168-174.
334. Tzeng, W.-N., and S.-Y. Yu. 1992. Effects of starvation on the formation of daily growth increments in the otoliths of milkfish, *Chanos chanos* (Forsskal), larvae. J. Fish Biol. 40: 39-48.
335. Uchida, K., K. Tsukamoto, S. Ishii, R. Ishida, and T. Kajihara. 1989. Larval competition for food between wild and hatchery-reared ayu, *Plecoglossus altivelis* Temminck et Schlegel, in culture ponds. J. Fish Biol. 34: 399-407.
336. Ueno, R., K. Uno, S.S. Kubota, and Y. Horiguchi. 1989. Determination of oxytetracycline in fish tissues by high performance liquid chromatography. Bull. Jpn. Soc. Sci. Fish. 55(7): 1273-1276.
337. Umezawa, A., and K. Tsukamoto. 1991. Factors influencing otolith increment formation in Japanese eel, *Anguilla japonica* T. and S., elvers. J. Fish Biol. 39: 211-223.
338. Uno, K., T. Aoki, and R. Ueno. 1992. Pharmacokinetic study of oxytetracycline in cultured rainbow trout, amago salmon, and yellowtail. Bull. Jpn. Soc. Sci. Fish. 58(6): 1151-1156.

339. Van Coillie, R. 1967. Etude a l'aide de tetracyclines de la croissance periodique des ecailles de Teleosteens. [A study on incremental scale growth using tetracycline on teleostean fish]. Nat. Can. (Que.) 94: 29-58. [In French, English abstract]
340. Villavicencio de Muck, Z. 1989. Tetracycline labelling for age and growth studies in fish, with emphasis on the Peruvian anchoveta, pp. 174-178. In D. Pauly, P. Muck, J. Mendo, and I. Tsukayama (ed.) The Peruvian upwelling ecosystem: dynamics and interactions. ICLARM Conf. Proc. no. 18. International Center for Living Aquatic Resources Management, Manila, The Philippines.
341. Vitinsh, M. 1978. Preliminary results of field experiments of marking Baltic flounder otoliths by use of tetracycline injections. Int. Counc. Exp. Sea Council Meeting J:8: 10 p.
342. Vitinsh, M. 1985. On individual variability of linear growth in the eastern Baltic flounder: data on otolith marking with tetracycline. Int. Counc. Exp. Sea Council Meeting J:20: 10 p.
343. Vitinsh, M. 1986. Otolith marking for the investigation of the variability in the eastern Baltic flounder. Fisch.-Forsch. 24(2): 69-72. [In Russian, English abstract]
344. Wagner, E.D. 1954. The effects of antibiotics and arsanilic acid on the growth of rainbow trout fingerlings. Prog. Fish-Cult. 16(1): 36-38.
345. Wahl, D.H., and R.A. Stein. 1987. Application of liquid oxytetracycline in formulated feeds to mark and treat tiger muskellunge (northern pike x muskellunge). Prog. Fish-Cult. 49: 312-314.
346. Weber, D., and G.J. Ridgway. 1967. Marking Pacific salmon with tetracycline antibiotics. J. Fish. Res. Board Can. 24(4): 849-865.
347. Weber, D., and R.J. Wahle. 1969. Effect of finclipping on survival of sockeye salmon (*Oncorhynchus nerka*). J. Fish. Res. Board Can. 26(5): 1263-1271.
348. Weber, D.D., and G.J. Ridgway. 1962. The deposition of tetracycline drugs in bones and scales of fish and its possible use for marking. Prog. Fish-Cult. 24(4): 150-155.
349. Weiss, R.E., and N. Watabe. 1978. Studies on the biology of fish bone - 1. Bone resorption after scale removal. Comp. Biochem. Physiol. 60A(2): 207-211.
350. Westgate, J., W. Hublou, and R. Steel. 1964. Tetracycline salmon marking studies. Oregon Fish Comm. Annu. Progr. Rep.: 9 p.
351. Wild, A., and T.J. Foreman. 1980. The relationship between otolith increments and time for yellowfin and skipjack tuna marked with tetracycline. Inter-Am. Trop. Tuna Comm. Bull. 17(7): 509-560.
352. Williams, T., and B.C. Bedford. 1974. The use of otoliths for age determination, pp. 114-123. In T.B. Bagena (ed.) Ageing of fish - the proceedings of an international symposium. Unwin Brothers Ltd., Old Woking, Surrey, England.
353. Wilson, C.A., D.W. Beckman, and J.M. Dean. 1987. Calcein as a fluorescent marker of otoliths of larval and juvenile fish. Trans. Am. Fish. Soc. 116: 668-670.
354. Wishkovsky, A., B.S. Roberson, and F.M. Hetrick. 1987. In vitro suppression of the phagocytic response of fish macrophages by tetracyclines. J. Fish Biol. 31(Suppl. A): 61-65.
355. Wold, A. 1952. Effects and uses of aureomycin. Aquarium J. 23(11): 232-235.
356. Wolf, L.E. 1952. Experiments with antibiotics and vitamin B12 in the diets of brown trout fingerlings. Prog. Fish-Cult. 14: 148-153.
357. Yamada, J. 1964. On the feature of scales developed in the regenerated skin of the goldfish, with special reference to the formation of their concentric ridges. Bull. Fac. Fish. Hokkaido Univ. 14(4): 199-208.
358. Yamada, U. 1971. [Vital staining of the hard tissues of carp, *Cyprinus carpio* Linne, with tetracycline-HCl, calcein and alizarin red S]. Bull. Seikai Reg. Fish. Res. Lab. 41: 107-116. (Transl. from Japanese by Fish. Res. Board Can. Transl. Ser. 2449, 1973)
359. Yoklavich, M.M., and G.W. Boehlert. 1987. Daily growth increments in otoliths of juvenile black rockfish, *Sebastodes melanops*: an evaluation of autoradiography as a new method of validation. U.S. Natl Mar. Fish. Serv. Fish. Bull. 85(4): 826-832.
360. Younk, J.A., and M.F. Cook. 1991. Fluorescent chemical marking of walleye larvae with a selected literature review of similar investigations. Minn. Dep. Nat. Resour. Sect. Fish. Invest. Rep. 408: 18 p.
361. Carignan, G., K. Carrier, and S. Sved. 1993. Assay fo oxytetracycline residues in salmon muscle by liquid chromatography with ultraviolet detection. J.

## APPENDIX

- Assoc. Off. Anal. Chem. Int. 76(2): 325-328.
362. Chisnall, B.L., and J.M. Kalish. 1993. Age validation and movement of freshwater eels (*Anguilla dieffenbachii* and *A. australis*) in a New Zealand pastoral stream. N.Z.J. Mar. Freshwater Res. 27: 333-338.
363. Diez, P., J.A. Berenguer, V. Calderon, J. Gonzalez, and P. Gordo. 1993. Detection of antimicrobial residues in fish by a microbiological method. Alimentaria 30: 45-53.
364. Monaghan, J.P., Jr. 1993. Comparison of calcein and tetracycline as chemical markers in summer flounder. Trans. Am. Fish. Soc. 122: 298-301.
365. Nagiec, M. 1992. Persistence of tetracycline mark in the otoliths of whitefish (*Coregonus lavaretus*). Biul. Morsk. Inst. Ryback. Gdynia. 127: 77-80.
366. Natanson, L.J. 1993. Effet of temperature on band deposition in the little skate, *Raja erinacea*. Copeia 1993: 199-206.
367. Parsons, G.R. 1993. Age determination and growth of the bonnethead shark *Sphyrna tiburo*: a comparison of two populations. Mar. Biol. (Berl.) (1) 117: 23-31.
368. Reimer, G.J., and L.M. Young. 1990. Validation of a method for determination of tetracycline antibiotics in salmon muscle tissue. J. Assoc. Off. Anal. Chem. 73(5): 813-817.
- Anguilla dieffenbachii*  
362
- Anguilla japonica*  
172 182 183 184 327 337
- Anoplopoma fimbria*  
17 18 19 20 22 25 26 27 196 281
- Archosargus probatocephalus*  
254
- Arctoscopus japonicus*  
330 331
- Arripis trutta*  
162
- Brevoortia tyrannus*  
298 340
- Caranx ignobilis*  
312
- Caranx melampygus*  
312
- Carassius auratus*  
142 168 215 216 217 218 247 248 249 313 357
- Carcharhinus falciformis*  
45
- Carcharhinus limbatus*  
44 45
- Carcharhinus plumbeus*  
44
- Catla catla*  
211
- Cephaloscyllium umbratile*  
319
- Chaetodon plebeius*  
101
- Chaetodon rainfordi*  
101
- Chanos chanos*  
333 334
- Chelmon rostratus*  
101
- Chrysoblephus cristiceps*  
54

#### TAXONOMIC INDEX

- Acanthocybium solandri*  
100
- Acanthurus nigrofasciatus*  
190
- Alburnus alburnus*  
35
- Alosa sapidissima*  
128 188
- Ambassis vachelli*  
212
- Anguilla anguilla*  
3 4 87 173 174 187 238 250 251
- Anguilla australis*  
362

<i>Chrysoblephus laticeps</i>	<i>Ginglymostoma cirratum</i>
54	63
<i>Chrysophrys auratus</i> - see <i>Pagrus auratus</i>	<i>Girella elevata</i>
	109
<i>Cirrhinus mrigala</i>	<i>Herklotichthys castelnau</i>
211	321
<i>Coregonus lavaretus</i>	<i>Hippoglossoides platessoides</i>
227 228 229 230 231 232 272 365	80
<i>Coregonus peled</i>	<i>Hoplias malabaricus</i>
82 230	244
<i>Ctenochaetus binotatus</i>	<i>Hoplosternum littorale</i>
190	43
<i>Ctenochaetus striatus</i>	<i>Hypoatherina tropicalis</i>
190	286
<i>Cynoscion nebulosus</i>	<i>Ichthyomyzon gagei</i>
198	200
<i>Cynoscion regalis</i>	<i>Ichthyomyzon greeleyi</i>
318	199
<i>Cyprinus carpio</i>	<i>Ictalurus furcatus</i>
2 77 118 119 120 121 170 171 192 204 205 206 207	106
208 264 265 284 314 358	
<i>Dascyllus aruanus</i>	<i>Ictalurus punctatus</i>
15	106 107 186 243
<i>Engraulis ringens</i>	<i>Istiophorus platypterus</i>
340	308
<i>Epinephelus guttatus</i>	<i>Katsuwonus pelamis</i>
275	8 9 267 279 280 351
<i>Epinephelus itajara</i>	<i>Labeo rohita</i>
52	192 210 211 293
<i>Epinephelus microdon</i>	<i>Lagodon rhomboides</i>
15 55	133
<i>Esox lucius</i>	<i>Lampetra appendix</i>
13 70 71 74 177 203 205 345	16
<i>Esox masquinongy</i>	<i>Lebistes reticulatus</i> - see <i>Poecilia reticulata</i>
345	
<i>Fundulus heteroclitus</i>	<i>Leiostomus xanthurus</i>
30 115 116	133 295
<i>Gadus morhua</i>	<i>Lepidopsetta bilineata</i> - see <i>Pleuronectes biliniatus</i>
33 80 154 156 240 241 255	
<i>Galeocerdo cuvieri</i>	<i>Lepomis macrochirus</i>
45	349

- Lethrinus nebulosus* 11 35 36 37 38 59 77 81 91 108 114 131 132 138 141  
15 143 152 153 164 165 185 194 204 242 257 269 271 276  
*Limanda ferruginea* - see *Pleuronectes ferrugineus* 277 287 296 311 324 329 336 338 344 346 348 354
- Lutjanus fulvus* *Oncorhynchus nerka*  
15 169 252 268 346 347 348
- Makaira indica* *Oncorhynchus rhodurus*  
308 338
- Melanogrammus aeglefinus* *Oncorhynchus tshawytscha*  
40 273 85 88 129 176 237 320 346 348 350
- Microgadus tomcod* *Ophiodon elongatus*  
283 22 27 65 66 67 68 69
- Micrometrus minimus* *Opsanus tau*  
288 93 297
- Micropogonias undulatus* *Orectolobus japonicus*  
353 319
- Micropodus salmoides* *Pagrus auratus*  
62 99 104 110 167
- Morone saxatilis* *Pagrus major*  
127 214 292 138
- Myripristis amaena* *Paralichthys dentatus*  
86 317 364
- Naso annulatus* *Parapimelodus valenciennesi*  
190 244
- Negaprion brevirostris* *Parika scaber*  
50 122 123 258 166
- Notemigonus crysoleucas* *Parophrys vetulus* - see *Pleuronectes vetulus*  
349
- Nototheniops nudifrons* *Petromyzon marinus*  
260 16 200
- Odonthestes regia* *Pimephales promelas*  
340 226
- Oncorhynchus gorbuscha* *Platichthys flesus*  
361 341 342 343
- Oncorhynchus keta* *Platichthys stellatus*  
31 105 329 59 60
- Oncorhynchus kisutch* *Plecoglossus altivelis*  
32 157 159 176 346 325 326 328 335
- Oncorhynchus masou* *Plectropomus maculatus*  
329 98
- Oncorhynchus mykiss* *Pleuronectes americanus*  
80 154 307

<i>Pleuronectes bilineatus</i>	<i>Rhizoprionodon terraenovae</i>
94 96 125	44 45
<i>Pleuronectes ferrugineus</i>	<i>Rhombosolea tapirina</i>
80	310
<i>Pleuronectes platessa</i>	<i>Rutilus rutilus</i>
5 266	35 204
<i>Pleuronectes vetulus</i>	<i>Salmo fario</i>
95	204 205
<i>Poecilia reticulata</i>	<i>Salmo gairdneri</i> - see <i>Oncorhynchus mykiss</i>
29 239	
<i>Pomacentrus moluccensis</i>	<i>Salmo salar</i>
102 103	1 35 36 51 117 245
<i>Pomacentrus nagasakiensis</i>	<i>Salmo trutta</i>
259	132 165 256 271 289 290 356
<i>Pomacentrus wardi</i>	<i>Salvelinus fontinalis</i>
103	79 124 131 132 165 257
<i>Pomoxis annularis</i>	<i>Salvelinus leucomaenis</i>
316	329
<i>Prionace glauca</i>	<i>Salvelinus namaycush</i>
299	46 49 193
<i>Pristipomoides filamentosus</i>	<i>Sardinops sagax</i>
262	340
<i>Prochilodus platensis</i>	<i>Scarus frenatus</i>
244	190
<i>Pseudopleuronectes americanus</i> - see <i>Pleuronectes americanus</i>	<i>Scarus globiceps</i>
	190
<i>Ptychocheilus lucius</i>	<i>Scarus niger</i>
224 225 226	190
<i>Raja clavata</i>	<i>Scarus oviceps</i>
137 274	190
<i>Raja eglanteria</i>	<i>Scarus psittacus</i>
191	190
<i>Raja erinacea</i>	<i>Scarus rivulatus</i>
366	190
<i>Raja microocellata</i>	<i>Scarus schlegeli</i>
274	189 190
<i>Raja montagui</i>	<i>Scarus sordidus</i>
274	190
<i>Rhincodon typus</i>	<i>Sciaenops ocellatus</i>
58	28 53 221 222 353

<i>Scomber japonicus</i>	<i>Trematomus newnesi</i>
144 146 147 148 149 150 151	261
<i>Sebastes flavidus</i>	<i>Triakis semifasciata</i>
64 181 233 294	175 303 304
<i>Sebastes melanops</i>	<i>Xiphias gladius</i>
359	140
<i>Seriola quinqueradiata</i>	<i>Zebrasoma scopas</i>
138 338	190
<i>Sphyraна tiburo</i>	<i>Zebrasoma verliferum</i>
253 367	190
<i>Spratelloides delicatulus</i>	SUBJECT INDEX
286	
<i>Squalus acanthias</i>	<u>Achromycin</u> - see Tetracycline
22 23 195 197 282 300 301 302 332	
<i>Squatina californica</i>	<u>Adults</u>
234 235 236	8 9 12 13 15 17 18 19 20 25 26 27 30 33 36 45 50 51 54 55 64 65 66 67 68 69 70 74 85 86 87 94 95 96 100 104 105 123 124 125 132 137 140 141 145 146 147 148 149 150 151 167 175 177 180 181 195 196 197 208 212 215 221 222 233 261 266 267 269 275 276 279 280 281 282 288 294 300 301 302 303 304 308 311 315 320 332 336 338 341 342 343 346 347 351 364 367
<i>Stizostedion vitreum</i>	<u>Age validation</u>
12 163 291 360	5 8 9 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 33 44 45 47 48 50 52 53 54 55 56 57 58 59 60 61 63 64 65 66 67 68 69 70 72 78 80 82 86 87 94 95 96 98 99 100 101 102 103 104 109 111 112 113 122 123 124 125 133 135 136 137 140 145 146 147 148 149 150 151 156 166 175 177 180 181 189 190 195 197 198 199 200 212 218 221 222 233 234 235 236 251 252 254 258 259 260 261 262 267 274 275 282 286 288 294 295 298 299 300 301 302 303 304 307 308 310 312 316 317 318 319 321 327 328 329 330 332 333 342 343 351 352 359 362 367
<i>Tautogolabrus adspersus</i>	<u>Annual increments</u>
113	8 9 12 13 15 16 17 18 22 23 25 26 28 33 44 45 50 52 53 54 56 57 58 63 65 66 67 69 70 78 87 94 98 99 102 103 104 123 124 137 156 175 177 181 189 195 199 200 221 222 235 251 258 274 275 282 301 303 304 319 332 342 343 352 362 367
<i>Thryssa aestuaria</i>	<u>Aureomycin</u> - see Chlortetracycline
135	
<i>Thryssa hamiltoni</i>	<u>Brackish water</u>
136	36 38 127 251 276 277 283 337
<i>Thunnus alalunga</i>	<u>Calcified structure growth</u>
180	32 41 42 43 71 74 83 84 99 110 142 162 187 200 204 208 215 216 227 228 237 244 247 248 249 253 255 262 266 278 279 280 283 286 297 315 319 322 331
<i>Thunnus albacares</i>	
100 145 146 147 148 149 150 151 351	
<i>Thunnus thynnus</i>	
140	
<i>Tilapia melanopleura</i>	
339	
<i>Tilapia mossambica</i>	
278	
<i>Tilapia rendalli</i>	
84	
<i>Tinca tinca</i>	
205 229	
<i>Trachinotus terai</i>	
322	

334 337 339 342 343 349 351 357 366

Chlortetracycline

7 29 40 71 84 88 91 97 108 114 126 129 138 182 183  
192 227 228 229 231 239 244 256 257 268 273 284 287  
289 290 306 339 340 344 346 348 355 356 357 368

Cleithra

13 70 71 74 157 177 346

Daily increments

5 49 55 59 60 61 82 86 101 109 111 113 133 135 136  
145 146 147 148 149 150 151 166 180 190 198 212 218  
252 254 259 260 261 262 286 288 295 298 307 310 312  
316 317 318 321 327 328 329 330 333 334 337 351 359

Diadromous

157 158 159 160 172 326 329 347

Discussions - see Reviews

Effect on blood

6 118 173 174

Effect on body composition

2

Effect on digestion

81 313

Effect on feeding

141

Effect on immune system

115 116 119 121 172 173 264 265 354

Effect on scale growth

30 168

Effect on somatic growth

2 29 53 91 99 129 165 170 171 192 193 197 207 209  
211 219 226 231 240 255 256 257 268 287 289 290 293  
305 306 314 319 325 344 346 356

Effect on survival (condition)

13 18 20 25 26 27 37 62 65 85 88 91 129 130 131 135  
139 158 165 168 182 183 192 193 196 207 210 219 226  
231 239 240 255 256 272 281 284 292 293 311 325 326  
340 341 346 347 355 356 364

Eggs - see Embryos

Elvers - see Juveniles

Embryos

49 82 224 225 271 272 288 325 326 328 329

Extractions - see Residues

Fingerlings - see Juveniles

Fin rays

8 9 13 22 23 27 43 53 65 66 67 69 79 144 195 197 205  
208 227 228 244 282 291 300 301 302 308 332 348 360  
364

Freshwater

2 3 7 11 12 13 16 22 29 31 32 35 36 37 43 46 49 51 59  
62 70 71 74 77 79 81 82 84 85 87 88 91 105 106 107  
108 114 118 119 120 121 124 126 128 129 131 132 138  
141 142 143 152 153 163 164 165 168 169 170 171 172  
173 174 177 182 183 184 185 186 188 192 193 194 199  
200 203 204 205 206 207 208 210 211 214 215 216 217  
218 224 225 226 227 228 230 231 232 237 238 239 242  
243 244 245 247 248 249 252 256 257 264 265 268 269  
271 272 278 283 284 285 287 289 290 291 292 293 296  
306 309 311 313 314 316 318 320 324 325 328 329 335  
336 337 338 339 344 345 346 348 349 350 354 356 357  
358 360 362

Fry - see Larvae

General marking

3 4 10 31 39 46 49 75 76 79 92 128 130 134 144 154  
157 158 159 160 168 178 188 191 196 197 202 203 205  
214 220 224 225 226 229 230 231 232 238 240 245 255  
263 271 272 291 292 323 324 325 326 340 341 345 346  
347 348 350 353 358 360 364 365

Immersion

3 4 49 53 62 79 82 87 101 109 113 128 133 135 136  
162 163 166 182 183 188 190 192 193 198 212 224 225  
226 230 237 238 243 254 271 272 283 284 286 291 292  
295 307 310 311 316 317 318 321 325 326 327 328 329  
330 331 333 334 335 337 340 348 353 355 360

Ingestion

2 29 31 32 35 36 37 38 49 51 53 58 79 81 88 91 105  
106 107 108 114 117 120 127 128 129 131 132 141 143  
153 157 158 159 160 164 165 169 170 171 176 184 185  
193 210 214 219 227 228 231 232 239 240 245 252 255  
256 257 264 265 268 269 276 277 287 289 290 293 296  
306 309 311 313 314 320 324 338 340 344 345 346 347  
348 350 356 365

Injection

5 8 9 12 13 16 17 18 19 20 22 23 25 26 27 28 30 33 37  
41 43 44 45 49 50 51 52 53 54 55 59 60 62 64 65 66  
67 68 69 70 71 74 80 84 85 86 87 94 95 96 98 99 100  
102 103 104 107 110 120 121 122 123 124 125 137 140  
144 145 146 149 150 151 154 156 161 167 168 172 173  
174 175 177 180 181 187 189 191 193 194 195 196 197  
198 199 200 203 204 205 206 208 215 216 217 218 221  
222 233 234 235 236 244 247 250 251 260 261 262 264  
265 266 267 274 275 278 279 280 281 282 284 288 294  
297 298 299 300 301 302 303 304 308 311 312 319 322  
332 339 340 341 342 343 348 349 351 357 358 359 362  
364 366 367

Juveniles

2 3 5 12 15 18 23 28 29 32 35 38 41 44 45 49 50 51 52  
 53 59 60 62 66 67 68 69 71 74 81 84 87 88 95 99 101  
 105 106 107 109 113 114 117 119 120 121 122 123 127  
 128 131 132 135 137 153 157 159 162 163 165 168 169  
 176 190 193 194 196 198 203 205 206 208 214 217 218  
 227 228 230 231 232 234 235 236 237 240 241 245 254  
 255 258 259 262 264 265 275 276 281 286 289 290 291  
 292 293 298 307 310 312 316 317 318 319 327 328 331  
 337 338 339 340 344 345 346 347 348 349 350 351 353  
 354 356 358 359 367

Larvae

16 31 49 79 82 105 111 128 133 188 192 193 198 199  
 200 210 224 225 226 227 228 229 230 237 243 252 254  
 283 286 292 293 295 317 320 321 323 324 325 326 328  
 329 330 333 334 335 353 360 365

Mandibles

41 79 203 204 205 291

Marine

5 8 9 15 17 18 19 20 22 23 25 26 27 28 30 33 35 40 44  
 45 47 50 51 52 53 54 55 56 58 59 60 63 64 65 66 67  
 68 69 72 78 80 86 87 93 94 95 96 98 99 100 101 102  
 103 104 109 110 113 115 116 117 122 123 125 133 135  
 136 137 138 139 140 144 145 146 147 148 149 150 151  
 154 156 162 166 167 175 179 180 181 189 190 191 195  
 196 198 212 213 221 222 233 234 235 236 240 241 250  
 253 254 255 258 259 260 261 262 266 267 273 274 275  
 279 280 281 282 286 288 294 295 297 298 299 300 301  
 302 303 304 307 308 310 312 317 318 320 321 322 327 330  
 331 332 333 334 338 340 341 342 343 351 353 359 364  
 366 367

Mass marking

3 4 31 49 82 87 101 105 109 113 128 133 136 157 158  
 159 160 162 163 166 188 190 198 212 224 225 226 227  
 228 230 231 232 237 240 245 252 254 255 271 272 283  
 286 291 292 295 307 310 316 317 318 320 321 324 325  
 326 327 328 329 330 331 333 334 335 337 340 345 346  
 347 348 350 353 360 365

Migration studies

213 329

Opercula

12 79 232 348

Otoliths

3 4 5 15 16 17 18 22 25 26 27 28 33 39 46 48 49 52 53  
 54 55 59 60 61 74 82 86 87 94 98 99 101 102 103 104  
 109 110 111 112 113 124 125 128 133 135 136 145 146  
 147 148 149 150 151 154 156 162 163 166 167 168 180  
 181 188 189 190 196 198 199 200 212 214 215 216 217  
 218 221 222 224 225 226 230 231 232 237 244 245 250  
 251 252 254 255 259 260 261 262 266 271 272 275 283  
 286 288 292 295 298 307 308 310 312 316 317 321 325  
 326 327 328 329 330 331 333 334 335 337 340 341 342  
 343 348 351 352 353 358 359 360 362 364 365

Oxytetracycline

1 2 5 6 7 11 13 16 17 18 19 20 21 22 23 24 25 26 27  
 28 31 32 33 34 35 36 37 38 40 44 45 49 51 52 53 54  
 55 59 60 61 62 64 65 66 67 68 69 71 72 77 78 79 80  
 81 85 87 89 94 95 96 97 104 105 106 107 110 117 118  
 119 120 121 124 125 127 128 130 131 132 133 138 139  
 141 144 145 146 147 148 149 150 151 152 153 158 159  
 160 162 163 164 165 167 169 170 171 172 173 174 175  
 176 177 180 181 184 185 186 188 191 192 193 194 195  
 196 197 199 200 209 210 211 220 221 222 223 233 235  
 237 240 241 242 243 244 245 246 252 254 255 256 262  
 264 265 266 269 270 273 275 276 277 281 282 283 284  
 291 292 293 294 296 298 300 301 302 303 304 306 307  
 308 310 311 312 313 314 315 316 317 318 319 320 333  
 334 336 338 339 340 344 345 346 347 348 350 351 354  
 356 359 360 361 362 364 367 368

Residues

7 11 34 35 36 37 38 40 51 77 89 93 97 106 107 108  
 114 117 120 121 126 127 132 138 139 143 152 153 155  
 158 159 160 164 169 176 179 184 185 186 194 206 223  
 242 243 246 269 270 273 276 277 285 296 306 311 336  
 338 361 363 368

Reviews

7 10 14 21 24 39 47 48 49 56 57 61 72 73 75 76 78 90  
 92 111 112 130 134 139 147 148 161 178 213 219 220  
 238 305 309 352 360

Ribs

79 227 245 291 324 346 347 348 349

Scales

27 30 53 71 74 79 83 84 115 116 142 144 154 156 168  
 177 203 216 217 232 244 247 248 249 278 291 318 339  
 340 348 357

Smolts - see JuvenilesSpines - see Fin raysStatoliths - see OtolithsStocking contribution

105 163 241 252 320 335

Terramycin - see OxytetracyclineTetracycline

3 4 8 9 12 15 30 39 43 48 50 57 58 63 70 71 73 74 77  
 82 86 92 93 97 98 99 100 101 102 103 109 111 113  
 115 116 122 123 128 135 136 137 140 143 154 156 157  
 166 168 179 187 189 190 193 198 202 203 204 205 206  
 207 208 212 214 215 216 217 218 224 225 226 230 231  
 232 234 236 238 244 247 250 251 253 258 259 260 261  
 267 271 272 273 274 278 279 280 284 286 288 293 295  
 297 299 309 321 322 323 324 325 326 327 328 329 330  
 331 332 335 337 339 340 341 342 343 346 348 349 350  
 352 353 354 358 366 368

Vertebrae

3 4 31 32 44 45 50 58 63 79 105 123 137 156 168 175  
187 227 228 231 232 234 235 236 240 244 245 253 255  
258 269 274 291 297 303 304 315 319 320 340 346 347  
358 366 367