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TUNAS AND TUNA FISHERIES OF THE WORLD AN ANNOTATED BIBLIOGRAPHY, 1930-53

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ABSTRACT

This bibliography attempts to list, with descriptive annotations and a subject index, important literature published between 1930 and 1953 dealing with the tunas and their fisheries in all parts of the world. It is thus a continuation of Corwin's (1930) work, which extended with similar scope through 1929, and an extension of Shimada's (1951), which was limited to the biology of Pacific tunas. The tunas with which it deals are those fishes customarily so-called in commercial parlance and usually classified in the genera *Thunnus*, *Neothunnus*, *Parathunnus*, *Germo*, *Katsuwonus*, *Euthynnus*, and *Auxis* and their various synonyms. All aspects of the biology of the tunas are dealt with, as are descriptions and histories of all types of tuna fisheries, commercial and exploratory tuna fishing methods and results, fishing gear, catch statistics, and fishery management, but processing technology, economics and marketing, folklore, and purely literary references have been excluded.

TUNAS AND TUNA FISHERIES OF THE WORLD: AN ANNOTATED BIBLIOGRAPHY, 1930-53

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Pacific Oceanic Fishery Investigations

This bibliography is an expansion and continuation of that compiled by Shimada (1951) for the biology of the Pacific tunas. It covers the period from the publication of the tuna bibliography of Corwin (1930) to 1953, inclusive, and its geographical scope is world-wide. It incorporates all of Shimada's material except that which antedates 1930.

The subject matter of the bibliography comprises all aspects of the biology of the tunas as well as the tuna fisheries, fishing methods and gear, fishery statistics, laws, and regulations. The subject index following the bibliography provides a detailed outline of its content. Papers dealing exclusively with processing technology, fishery economics and marketing, and material of purely literary or folkloric interest have been excluded.

The compilers have considered as tunas most of the scombroid fishes ordinarily so-called: the albacore (*Germo*), the bluefin (*Thunnus thynnus*) or black tuna (*T. orientalis*), the yellowfin (*Neothunnus*), the oceanic skipjack or striped tuna (*Katsuwonus*), the bigeye and blackfin tunas (*Parathunnus*), and the Australian *T. tonggol* and *T. maccoyii*. The frigate mackerels (*Auxis*) and the little tunnies or black skipjack (*Euthynnus*) have been included, but the bonitos of the genus *Sarda* have not. The compilers were spared having to make any arbitrary decisions as to the status as tunas of such borderline cases as the dogtoothed tuna (*Gymnosarda*), the oriental bonito (*Kishinoella*), and the Spanish mackerels (*Scomberomorus*) by the circumstance of their not finding any papers exclusively concerned with these fishes. Needless to say, the choice of scientific names used in indexing the bibliography is not meant to reflect any taxonomic judgments but is based solely on considerations of convenience and familiarity. The scientific names employed in the various papers are cited without change in the annotations, but have been cross-referred to the appropriate category in the index where there seemed to be no doubt as to the synonymy.

The bibliography is a selective one, not only in the subject matter of the papers cited, but also with respect to their importance. While it has been impossible to set up hard-and-fast criteria of significance, every effort has been made to exclude material of an ephemeral or superficial nature, without overlooking any real contributions to knowledge concerning the tunas and their fisheries. In fields and areas where the literature is comparatively rich, it was possible to be more discriminating; in others more sparsely documented, the compilers had to take whatever they could find. In one case, that of the sizeable mass of annual Progress Reports covering semi-commercial fishing cruises by Japanese prefectural research vessels, which are published year after year with little variation in content, only representative samples of the more recent and comprehensive reports from each Prefecture have been included. In general, the compilers have sought papers of a solid scientific character, but such sources as fishery trade journals have not been passed over when they presented new information not more thoroughly covered elsewhere. Because of the inclusion of a number of papers which the compilers were unable to examine, it is possible that some items of little value have found their way into the collection. As completeness is a bibliographer's ideal most difficult of attainment, there may well be some important contributions that have evaded our search.

Annotations, following in general the pattern of those in Shimada's work, have been supplied for all items. The purpose is not to assess the value or reliability of the paper, but to give a clearer notion of content than can be gathered from a title. Papers which the compilers were not able to examine have the annotation limited to a statement of the categories under which the item was indexed. Some unevenness of treatment in the annotations is due to the fact that the compilers tried to annotate a little more fully than Shimada, but were under the necessity of borrowing his an-

notations verbatim for a number of items that he examined in Japan but could not bring back to the POFI library.

Papers are cited in alphabetical order by the authors' names and in chronological order under each author, and an abbreviated style has been used, the volume immediately following the name of the publication, the number next in parentheses, and the pagination following a colon. Titles of papers in European languages have been left in their original form, but those of Japanese items have been translated. A list is provided of full forms of names of periodicals abbreviated in the citations and of translations of names of Japanese journals. The abbreviations of American and European journal names follow the World List of Scientific Periodicals, 1900-50. Translations of the names of Japanese journals are given in brackets if supplied by the compilers and in parentheses if they appear, or have appeared in the past, on the journal. Japanese journals which have well-known and consistently used English names are cited by them in the bibliography, and the Japanese equivalents are supplied in the list. Japanese names were not abbreviated by the compilers, it being impracticable to do so with their Romanized forms.

A few names abbreviated in Chinese characters in Japanese bibliographies have been cited as is, with the compilers' best guess as to their full forms.

A list of the major references and sources consulted in the compilation follows at the end of this introduction. In addition, reports and publications of various marine laboratories, too numerous to mention here, were checked. Often such publications are not indexed. In order to find out what had been published in Russian reports, inquiry was made of the Reference Department of the Library of Congress, and catalogue cards were received for those publications in the collection of the Library of Congress.

The compilers acknowledge gratefully the cooperation of the library staffs of the University of Hawaii, Pineapple Research Institute of Hawaii, Hawaiian Sugar Planters' Association, and the Bernice P. Bishop Museum in making their collections available. Invaluable assistance was given also by staff members of the libraries of the University of California (Berkeley and Los Angeles); Scripps Institution of Oceanography; and the Central Library of the U. S. Department of the Interior, in providing microfilm and photostatic copies of many items in the bibliography.

MAJOR REFERENCES AND SOURCES CONSULTED

- BESTERMAN, T.**
1952. Index bibliographicus: directory of current periodical abstracts and bibliographies. V.1, Science and technology. 3d ed, revised. Paris, UNESCO, 52 p.
- Bibliographia oceanographica.** Venice, Consiglio Nazionale Delle Ricerche.
- Bibliography of agriculture.** (U. S. Dept. of Agriculture Library). Washington, D. C., Government Printing Office.
- Bibliography of reports on fish and the fish industry.** Washington, D. C., Office of Technical Services, U. S. Dept of Commerce.
- Bibliography of scientific and industrial reports.** Washington, D. C., Office of Technical Services, U. S. Dept. of Commerce.
- Bibliography of translations from Russian scientific and technical literature,** Washington, D. C., Scientific Translations Center, Library of Congress.
- Biological abstracts.** Philadelphia, Pennsylvania.
- BLANCO, GUILLERMO and H. R. MONTALBAN.**
1951. A bibliography of Philippine fishes and fisheries. Philippine Journal of Fisheries 1 (2): 107—130.
- BOHATTA, H. and F. HODES**
1950. Internationale Bibliographie der Bibliographien. Frankfurt, Klostermann, 652 p.
- COLLISON, ROBERT L.**
1951. Bibliographies: subject and national, a guide to their contents, arrangement and use. London, Crosby Lockwood and Son Ltd., 172 p.
- Commercial fisheries abstracts.** Washington, D. C., Fish and Wildlife Service, U. S. Dept. of the Interior.
- Commercial fisheries review,** Washington, D. C., Fish and Wildlife Service, U. S. Dept. of the interior.
- Cumulative book index.** New York, H. W. Wilson Company.
- Current bibliography.** In: Journal du Conseil (Each issue of this journal of the International Council for the Study of the Sea has this section which is an excellent means of keeping abreast of the literature in the field.)
- Current Caribbean bibliography.** Kent House, Port-of-Spain, Trinidad, B. W. I.
- Fisheries bulletin.** Rome. FAO.
- GRIER, MARY C.**
1941. Oceanography of the North Pacific Ocean, Bering Sea and Bering Strait: a contribution toward a bibliography. Seattle, University of Washington. (Pisces Section, p. 195—227).
- Industrial arts index.** New York, H. W. Wilson Company.
- The Japan Science Review. Biological Sciences.** Tokyo.
- Monthly catalog of U. S. government publications.** Washington, D. C., Government Printing Office.
- Monthly list of Russian accessions.** Washington, D. C., Library of Congress.
- MOROVIC, DINKO.**
1950. Prilog bibliografiji jadranskog ribarstva. (A contribution to the bibliography of Adriatic fisheries). Split, Jugoslavia, Institut Oceanografiju i Ribarstvo u Splitu, 142 p.
- OKADA, YAICHIRO, and K. MATSUBARA.**
1953. Bibliography of fishes in Japan (1612—1950). Mie Prefecture, Faculty of Fisheries, Prefectural University of Mie, 228 p.
- PACIFIC OCEANIC BIOLOGY PROJECT, 1946—1949.**
This project was carried out by the Woods Hole Oceanographic Institution, Woods Hole, Mass., under contract to the Office of Naval Research, U. S. Navy. A bibliographic card file of more than 10,000 titles on Pacific Oceanic Biology (Oceanographic Research) was compiled. This file was duplicated, in photostatic form, in its entirety and deposited in the library of the Pacific Oceanic Fishery Investigations in Honolulu.
- UTINOMI, HUZIO.**
1952. Bibliography of Micronesia. Honolulu, University of Hawaii Press. (Pisces section, p. 27—30; Fishery, p. 123—127).
- World fisheries abstracts.** Rome, FAO.
- Zoological record (Pisces Section).** London, Zoological Society.

LIST OF ABBREVIATIONS AND TRANSLATIONS OF PERIODICAL TITLES

- A. Hancock Pacif. Exped.**—Allan Hancock Pacific Expedition. Los Angeles.
- Amer. Mus. Novit.**—American Museum Novitates. New York.
- Ann. biol., Copenhagen.**—Annales Biologiques. (Conseil Permanent International pour l'Exploration de la Mer.)
- Ann. Inst. Océanogr.**—Annales de L'Institut Océanographique. Paris.
- Ann. Mag. nat. Hist.**—Annals and Magazine of Natural History. London.
- Ann. S. Afr. Mus.**—Annals of the South African Museum. Cape Town.
- Arch. Fischereiwiss.**—Archiv für Fischereiwissenschaften.
- Arch. Zool. exp. gen.**—Archives de Zoologie Expérimentale et Générale. Paris.
- Atti Conv. Biol. mar.**—Atti del 2° Convegno di Biologia Marina. Messina.
- Aust. J. Mar. Freshw. Res.**—Australian Journal of Marine and Freshwater Research. Melbourne.
- Aust. Zool.**—Australian Zoologist. Sydney.
- Ber. dtsch. Komm. Meeresforsch.**—Bericht der Deutschen Wissenschaftlichen Kommission für Meeresforschung. Berlin.
- Bibl. Ned. ind. nat. Ver.**—Bibliotheek van de Nederlandsch Indische Natuurhistorische Vereeniging. Batavia.
- Biol. Bull., Shanghai.**—Biological Bulletin of St. John's University. Shanghai.
- Bol. Comp. Admin. Guano.**—Boletín de la Compañía Administradora del Guano. Lima.
- Bol. Dep. for. Mex.**—Boletín del Departamento Forestal y de Caza y Pesca de Mexico.
- Bol. Inst. esp. Oceanogr.**—Boletín del Instituto Español de Oceanografía. Madrid.
- Bol. Mus. Hst. nat. Prado.**—Boletín del Museo de Historia Natural "Janvier Prado". Lima.
- Bol. Oceanogr. Pesc., Madr.**—Boletín de Oceanografía y Pescas. Madrid.
- Boll. Mus. Zool. Anat. comp. Torino.**—Bollettino dei Musei di Zoologia e di Anatomia Comparata della R. Università. Torino.
- Boll. Pesca Piscic. Idrobiol.**—Bollettino di Pesca, di Piscicoltura, e di Idrobiologia. Roma.
- Boll. Zool. agr. Bachic.**—Bollettino di Zoologia Agraria e Bachicoltura. Torino.
- Broch. Sta. océanogr. Salammbô.**—Brochure. Station Océanographique de Salammbô. Tunis.
- Bull. Amer. Mus. nat. Hist.**—Bulletin of the American Museum of Natural History. New York.
- Bull. biogeogr. Soc. Japan.**—Bulletin of the Biogeographical Society of Japan. Tokyo.
- Bull. Fish. Res. Bd. Can.**—Bulletin. Fisheries Research Board of Canada. Ottawa.
- Bull. Fish. Soc. Philipp.**—Bulletin of the Fisheries Society of the Philippines.
- Bull. Inst. océanogr. Monaco.**—Bulletin de l'Institut Océanographique de Monaco.
- Bull. Japan Sea reg. Fish. Res. Lab.**—Bulletin of Japan Sea Regional Fisheries Research Laboratory (Nihonkaiku susan kenkyūsho kenkyū hōkoku).
- Bull. Jap. Soc. sci. Fish.**—Bulletin of the Japanese Society of Scientific Fisheries (Nippon susangakukai shi). Tokyo.
- Bull. mar. Sci. Gulf Caribb.**—Bulletin of Marine Science of the Gulf and Caribbean. Coral Gables, Fla.
- Bull. Pacif. sci. Inst. Fish., Vladivostok.**—Bulletin of the Pacific Scientific Institute of Fisheries and Oceanography. Vladivostok.
- Bull. physlogr. Sci. Res. Inst. Tokyo Univ.**—Bulletin of the Physiographical Science Research Institute, Tokyo University. (Tōkyō daigaku ritchi shizen kagaku kenkyūsho hōkoku). Tokyo.
- Bull. Sch. Fish Hokkaido.**—Bulletin of the School of Fisheries, Hokkaido Imp. University. Sapporo.
- Bull. Scripps Instn. Oceanogr. tech.**—Bulletin. Scripps Institution of Oceanography. Technical Series. La Jolla, Calif.
- Bull. Serv. Élev. Industr. anim. A. O. F.**—Bulletin des Services de l'Élevage et des Industries Animales de A. O. F. Dakar.
- Bull. Soc. Océanogr. Fr.**—Bulletin de la Société d'Océanographie de France. Paris.
- Bull. Soc. portug. Sci. nat.**—Bulletin de la Société Portugaise des Sciences Naturelles. Lisbon.
- Bull. Soc. zool. Fr.**—Bulletin de la Société Zoologique de France. Paris.
- Bull. Sta. Aquic. Pêche Castiglione.**—Bulletin de la Station d'Aquiculture et de Pêche de Castiglione. Algeria.
- Bull. Sta. océanogr. Salammbô.**—Bulletin. Station Océanographique de Salammbô. Tunis.
- Bull. Tōhoku reg. Fish. Res. Lab.**—Bulletin of Tōhoku Regional Fisheries Research Laboratory (Tōhoku kaiku susan kenkyūsho kenkyū hōkoku).
- Bull. U. S. nat. Mus.**—Bulletin. United States National Museum. Smithsonian Institution. Washington.

- Bur. Fish. Min. Agr. and For.**—Bureau of Fisheries. Ministry of Agriculture and Forestry. Japanese Imperial Government. (Suisankyoku. Nōrinshō. Dai Nippon Teikoku Seifu). Tokyo.
- C. R. Acad. Sci., Paris.**—Comptes Rendus, Académie des Sciences. Paris.
- C. R. Ass. Anat.**—Compte Rendu de l'Association des Anatomistes. Lisbonne.
- C. R. Soc. Biogéographie.**—Compte Rendu de la Société de Biogéographie. Paris.
- Calif. Div. Fish Game. Bur. Mar. Fish. Mimeogr. Rep.**—California. Division of Fish and Game. Bureau of Marine Fisheries.
- Calif. Fish Game.**—California Fish and Game. Sacramento.
- Cent. Fish. Expt. Sta. Rep.**—Central Fisheries Experiment Station Reports. (Suisan shikenjō chōsa hōkoku). Tokyo.
- Chiba-ken suisan shikenjō jigyō hōkoku.**—Progress Report of Chiba Prefectural Fisheries Experiment Station.
- Circ. Pac. biol. Sta. Nanaimo.**—Circular. Pacific Biological Station, Nanaimo, B. C.
- Circ. U. S. Fish Wildl. Serv.**—Circular of the United States Fish and Wildlife Service. Washington.
- Comm. Fish. Rev.**—Commercial Fisheries Review. U. S. Fish and Wildlife Service. Washington.
- Contrib. cent. Fish. Sta. Japan**—Contributions. Central Fisheries Station of Japan (Suisan shikenjō gyōseki shū). Tokyo.
- Contrib. Nankai reg. Fish Res. Lab.**—Contributions of Nankai Regional Fisheries Research Laboratory (Nankaiku suisan kenkyūsho gyōsekishū).
- Copeia.**—Copeia. New York.
- Corr. Pesca.**—Corriere di Pesca. Roma.
- Fauna o. flora.**—Fauna och Flora. Uppsala.
- Faune ichthyol. Atlan. N.**—Faune Ichthyologique de l'Atlantique Nord. Paris.
- Fish. Bull. F. A. O.**—Fisheries Bulletin. Food and Agriculture Organization of the United Nations. Rome.
- Fish Bull., Sacramento.**—Fish Bulletin. California (Division of Fish and Game) Fish and Game Commission. Sacramento.
- Fishery Bull., U. S.**—Fishery Bulletin. Fish and Wildlife Service. Washington.
- Fish. Div., FAO, U. N.**—Fishery Division of the Food and Agriculture Organization of the United Nations. Washington.
- Fish. Invest. (Suppl. Rep.), Imp. Fish. Exp. Sta.**—Fishery Investigation (Supplementary Report). Imperial Fisheries Experiment Station. Tokyo.
- Fish. Leafl., Wash.**—Fishery Leaflet. Washington.
- Fischmarkt. Cuxhaven.**—Fishmarket. Cuxhaven.
- Fish. News Lett. Aust.**—Fisheries News Letter, Council for Scientific and Industrial Research, Australia. Melbourne.
- Fish. Progr. Rept.**—Fisheries Progress Report. Division of Fish and Game, Board of Commissioners of Agriculture and Forestry, Territory of Hawaii.
- Fish. Res. Progr. Rep.**—See Fish. Progr. Rep.
- Fish. Technol. Lect. Ser.**—(Suisan seizō kōgaku kōza) [Fishery Technology Lecture Series]. Tokyo.
- Formosa Govt.-Gen. Fish Exp. Sta. Publ.**—Formosa Government-General Fisheries Experiment Station. Publications. (Taiwan sōtokufu suisan shikenjō shuppan). Kiirun.
- Gyorō kenkyūkai kaihō.**—[Bulletin of the Fishing Research Society].
- Hokkaidō suisan shikenjō suisan chōsa hōkoku.**—Hokkaidō Fisheries Experiment Station. Reports of Fishery Investigations.
- Hokkaidō sui shi junpō (Hokkaidō suisan shikenjō junpō).**—[Decadarial Reports of the Hokkaidō Fisheries Experiment Station].
- Hoku sui shi chō hō.**—[Possibly abbr. of Hokkaidō suisan shikenjō suisan chōsa hōkoku, Hokkaidō Fisheries Experiment Station, Reports of Investigations].
- Hongkong Nat.**—Hongkong Naturalist.
- Ichth. Contr. Int. Game Fish Assoc.**—Ichthyological Contributions of the International Game Fish Association. New York.
- Int. Congr. Zool.**—International Congress of Zoology.
- Int. Rev. Hydrobiol.**—Internationale Revue der gesamten Hydrobiologie u. Hydrographie. Leipzig.
- Itsumishō tōsen rombun.**—[Itsumi prize papers]. Publ. by Shizuoka kanzume kyōkai gijutsubu [Shizuoka Canning Association, Technical Section.]
- Jap. J. Ichth.**—Japanese Journal of Ichthyology [Gyōruigaku zasshi]. Tokyo.
- J. Commonw. sci industr. Res. Organ. Aust.**—Journal of the Commonwealth Scientific and Industrial Research Organization, Australia. Melbourne.
- J. Cons. int. Explor. Mer.**—Journal du Conseil Permanent International pour l'Exploration de la Mer. Copenhagen.
- J. Coun. sci. ind. Res. Aust.**—Journal of the Council for Scientific and Industrial Research, Australia. Melbourne.
- J. Fac. Sci. Tokyo Univ.**—Journal of the Faculty of Science, Tokyo Imperial University. Tokyo.
- J. Fish. Res. Instl.**—Journal of Fisheries Research Institute (Suisan kenkyūkai hō). Tokyo.
- J. imp. Fish. Exp. Sta.**—Journal of the Imperial Fisheries Experiment Station (Suisan shikenjō hōkoku). Tokyo.
- J. Mar. biol. Assoc. U. K.**—Journal of the Marine Biological Association of the United Kingdom. Plymouth.

- J. Pan-Pacif. Res. Instn.—Journal of the Pan-Pacific Research Institution. Honolulu.
- J. Tokyo Univ. Fish.—Journal of the Tokyo University of Fisheries. Yokosuka.
- Jap J. Zool.—Japanese Journal of Zoology. Tokyo.
- Kagaku.—[Science]. Tokyo.
- Kagaku nanyō.—[South Sea Science]. Palau.
- Kagoshima-ken suisan shikenjō jigyo hōkoku.—[Kagoshima Prefecture Fisheries Experiment Station Progress Reports].
- Kagoshima sui sen ken hō.—(Kagoshima suisan semmon gakkō kenkyū hōkoku.)—[Kagoshima Fisheries Vocational School Research Report].
- Kaiyō gyogyō.—[Oceanic fisheries]. Tokyo.
- Kaiyō no kagaku.—[Science of the sea]. Tokyo.
- Kanagawa sui shi geppō (Kanagawa suisan shikenjō geppo).—[Monthly Report of the Kanagawa Prefecture Fisheries Experiment Station].
- Katsuo to maguro.—[Skipjack and tuna]. (Organ of Federation of Japan Tuna and Bonito Fisheries Cooperative Associations).
- Kumamoto-ken suisan shikenjō jigyo hōkoku.—[Kumamoto Prefecture Fisheries Experiment Station Progress Report].
- Maguro gyogyō shiken hōkoku.—[Reports of Tuna Fishing Experiments]. Kanagawa Prefecture.
- Mem. Biol. mar.—Memorie di Biologia Marina e di Oceanografia. Messina.
- Mem. Bishop Mus.—Memoirs of the Bernice Pauahi Bishop Museum of Polynesian and Natural History. Honolulu.
- Mém. Off. Pêches Marit. Sér. Spéc.—Mémoires de l'Office des Pêches Maritimes, Série Spécial. Paris.
- Mem. R. Com. Talass. Ital.—Memoria R. Comitato Talassografico Italiano. Venice.
- Mid-Pacif. Mag.—Mid-Pacific Magazine. Honolulu.
- Mie-ken suisan shikenjō jigyo hōkoku.—[Mie Prefecture Fisheries Experiment Station Progress Report].
- Mie sui shi jihō (Mie-ken suisan shikenjō jihō).—[Mie Prefecture Fisheries Experiment Station News Bulletin].
- Miyagi no suisan.—[Miyagi Fisheries].
- Miyagi Pref. Fish. Exp. Sta.—Miyagi Prefectural Fisheries Experiment Station. (Miyagi-ken suisan shikenjō). Watanoha.
- Miyazaki-ken enyō gyogyō shidōsho gyōmu gaiyō. [Brief reports of the Miyazaki Prefecture high-seas fishery-guidance center].
- Monogr. Acad. nat. Sci. Philad.—Monographs. Academy of Natural Sciences of Philadelphia.
- Nagasaki-ken suisan shikenjō jigyo hōkoku.—[Nagasaki Prefecture Fisheries Experiment Station Progress Report].
- Nanyōchō suisan shikenjō jigyo hōkoku.—[Progress reports of the South Seas Government-General Fisheries Experiment Station]. Palau.
- Nanyō suisan.—[South Sea Fisheries]. Tokyo.
- Nanyō suisan jōhō.—[South Sea Fisheries News]. Palau.
- Nat. E. Afr., Nairobi.—Nature in East Africa, Nairobi.
- New Engl. Nat.—New England Naturalist. Boston.
- N. Z. J. Sci. Tech.—New Zealand Journal of Science and Technology. Wellington.
- Nippon kaiyōgakkai shi.—[Bulletin of the Oceanographical Society of Japan]. Tokyo.
- Nissan Fish. Res. Sta.—Nissan Fisheries Research Station. (Nissan suisan kenkyūjo). Odawara.
- Notas Inst. esp. Oceanogr.—Notas y resúmenes. Instituto Español de Oceanografía. Madrid.
- Note Ist. Biol. mar. Rovigno.—Note dell' Istituto Italo-germano di Biologia Marina di Rovigno d'Istria. Venezia.
- Notes Sta. marit. Cauda.—Notes. Station Maritime de Cauda. Service (Institut) Océanographique et des Pêches de l'Indochine. Saigon.
- Ōita-ken suisan shikenjō jigyo hōkoku.—Ōita Prefecture Fisheries Experiment Station Progress Report].
- Okinawa-ken suisan shikenjō hōkoku.—[Okinawa Prefecture Fishery Experiment Station Report].
- Okinawa-ken suisan shikenjō jigyo hōkoku.—[Okinawa Prefecture Fisheries Experiment Station Progress Reports].
- Ōyō kishō.—[Applied Meteorology]. Tokyo.
- Pacif. Fisherm.—Pacific Fisherman. Seattle, Wash.
- Pacif. Sci.—Pacific Science. Honolulu.
- Palao trop. biol. Stud.—Palao Tropical Biological Station Studies. Tokyo.
- Pamphl. Coun. sci. ind. Res. Aust.—Pamphlet. Council for Scientific and Industrial Research, Australia. Melbourne.
- Pan-Amer. Fish.—Pan-American Fisherman. San Diego.
- Philipp. J. Sci.—Philippine Journal of Science.
- Proc. Acad. nat. Sci. Philad.—Proceedings of the Academy of Natural Sciences of Philadelphia.
- Priroda. Zagreb.
- Proc. Gulf and Caribbean Fish. Inst.—Proceedings of the Gulf and Caribbean Fisheries Institute.
- Proc. Indo-Pacif. Fish. Coun.—Proceedings. Indo-Pacific Fisheries Council. Bangkok.
- Proc. Pacif. Sci. Congr. 6th.—Proceedings of the Pacific Science Congress. Sixth, Berkeley, California.
- Proc. U. S. nat. Mus.—Proceedings of the United States National Museum. Washington.
- Progr. Rep. biol. Stas. Nanaimo and Prince Rupert.—Progress Report of the Pacific Biological Station, Nanaimo, B. C., and Pacific Fisheries Experimental Station, Prince Rupert, B. C.

- R. Comit. talass. Ital. Mem.**—R. Comitato Talassografico Italiano (Istituto Centrale di Biologia Marina in Messina). Memoria.
- Rapp. Comm. int. Mer Médit.**—Rapport et Procès-verbaux des Réunions. Commission Internationale pour l'Exploration Scientifique de la Mer Méditerranée. Paris.
- Rapp. Cons. Explor. Mer.**—Rapport et Procès-verbaux des Réunions. Conseil Permanent International pour l'Exploration de la Mer. Copenhagen.
- Rec. Albany Mus.**—Records of the Albany Museum. Grahamstown.
- Rec. Canterbury (N. Z.) Mus.**—Records of the Canterbury Museum. Christchurch, N. Z.
- Rec. oceanogr. Wks. Jap.**—Records of Oceanographic Works in Japan.
- Report of Survey for Tuna Fishing (Maguro gyogyō chōsa hōkoku).**—See Tuna Fishing.
- Res. Rep. U. S. Fish Serv.**—Research Report. U. S. Fish and Wildlife Service. Washington.
- Rev. Sci.**—Revue Scientifique. Paris.
- Rev. Trav. Inst. sci. tech. Pêches marit.**—Revue des Travaux de l'Institut Scientifique et Technique des Pêches Maritimes. Paris.
- Rev. Trav. Off. Pêches marit.**—Revue des Travaux de l'Office des Pêches Maritimes. Paris.
- Ribarski kalendar.** Split.
- S.-annu. Rep. oceanogr. Invest., Tokyo.**—Semi-annual Report of Oceanographical Investigations. Imperial Fisheries Institute. Tokyo.
- S. Sea Sci.**—South Sea Science (Kagaku nanyō). Palau.
- SCAP Nat. Resour. Sect. Rep.**—Supreme Commander for the Allied Powers. General Headquarters. Natural Resources Section. Reports. Tokyo.
- Sci. Mon., N. Y.**—Scientific Monthly. New York.
- Sci. Progr. Twent. Cent.**—Science Progress in the Twentieth Century. London.
- Shizuoka-ken suisan shikenjō jigyo hōkoku.**—[Shizuoka Prefecture Fisheries Experiment Station Progress Reports].
- Shokubutsu oyobi dōbutsu.**—[Plants and animals]. Tokyo.
- Smithson. misc. Coll.**—Smithsonian Miscellaneous Collections. Washington.
- Spec. sci. Rep: Fish., U. S. Fish Wildl.**—Special Scientific Report: Fisheries. U. S. Fish and Wildlife Service. Washington.
- Stanf. ichthyol. Bull.**—Stanford Ichthyological Bulletin. Palo Alto.
- Suisan butsuri danwakai kaihō.**—[Bulletin of the Fisheries Physics Discussion Group]. Tokyo.
- Suisan gakkwai hō.**—(Proceedings of the Scientific Fisheries Association). Tokyo.
- Suisankai.**—(Journal of the Fisheries Society of Japan). Tokyo.
- Suisan kenkyū shi.**—[Journal of Fisheries Research]. Tokyo.
- Suisan kōza.**—(The text of the Fishery). Tokyo.
- Suisan seizō kōgaku kōza.**—[Fisheries Technology Lecture Series]. Tokyo.
- Suisel.**—[Fisheries Administration]. Tokyo.
- (Suppl. Rep.) Imp. Fish. Exp. Sta.**—(Supplementary Reports) Imperial Fisheries Experiment Station. Tokyo.
- Taihoku-shū suisan shikenjō gyōmu hōkoku.**—[Taihoku Province Fisheries Experiment Station Progress Report].
- Taiwan sōtokufu shikenjō jigyo hōkoku.**—[Formosa Government-General Fisheries Experiment Station Progress Report].
- Taiwan sōtokufu suisan shikenjō shiken hōkoku, kaiyō chōsa.**—[Formosa Government-General Fishery Experiment Station Reports, Oceanographic Investigations.]
- Taiwan sōtokufu suisan shikenjō shuppan.**—[Formosa Government-General Fisheries Experiment Station, Publications].
- Taiwan suisan zasshi.**—[Formosa Fisheries Magazine]. Taihoku.
- Tech. Pap. Commonw. sci. ind. Res. Organ. Div. Fish., Melb.**—Technical Papers. Commonwealth Scientific and Industrial Organization, Australia. Division of Fisheries, Melbourne.
- Tech. Rep. Woods Hole oceanogr. Inst.**—Technical Report of the Woods Hole Oceanographic Institution. Woods Hole, Mass.
- Tōkai daigaku sangyō kagaku kenkyūsho suisan kenkyūbu gyogyō shiryō.**—[Tokai University Industrial Science Laboratory, Fishery Research Section, Fishery Data].
- Tōkai daigaku suisan gijutsu sōsho.**—[Tokai University Papers on Fishery Technology].
- Trab. Inst. esp. Oceanogr.**—Trabajos del Instituto Español de Oceanografía. Madrid.
- Trans. Nat. Hist. Soc. Formosa.**—Transactions of the Natural History Society of Formosa. (Taiwan hakubutsu gakkai kaihō). Taihoku.
- Trans. N. Amer. Wildl. Conf.**—Transactions of the North American Wildlife Conference. Washington.
- Trans. roy. Soc. N. Z.**—Transactions and Proceedings of the Royal Society of New Zealand. Dunedin.
- Trav. Inst. océanogr. Indochine.**—Travaux de l'Institut Océanographique de l'Indochine. Saigon.
- Trav. Sta. Biol. marit. Lisbonne.**—Travaux de la Station de Biologie Maritime de Lisbonne.
- Treubia.**—Treubia. Buitenzorg.
- Tuna Fishing (Maguro gyogyō).**—Published by the Investigative Society of Tuna Fishery, Misaki.
- Vict. Nat., Melb.**—Victorian Naturalist, Melbourne.
- Zool. Mag.**—Zoological Magazine. (Dōbutsugaku Zasshi). Tokyo.
- Zool. Meded.**—Zoologische mededeelingen. Rijksmuseum van Natuurlijke Historie te Leiden.
- Zool. Ser. Field Mus. nat. Hist.**—Zoological Series. Field Museum of Natural History. Chicago.
- Zoologica, N. Y.**—Zoologica. Scientific Contributions of the New York Zoological Society. New York

ANNOTATED BIBLIOGRAPHY

Meanings of symbols used in the references are as follows:

J = in Japanese only.

JE = published in Japan but written in English.

Je = in Japanese with an English abstract.

P = in the Pacific Oceanic Fishery Investigations Library.

For full bibliographic information on the abbreviations of the periodicals see the section List of Abbreviations and Translations of Periodical Titles, pages 176-179.

ABE, TOKIHARU.

1939. A list of the fishes of the Palao Islands. *Palao trop. biol. Stud.* 4:567. [J,P]
Germo macropterus, *Katsuwonus pelamys*, *Thunnus thynnus*: recorded, distribution.

AIKAWA, HIROAKI.

1932. On tuna fishing conditions on the Pacific coast. *Suisan butsurei danwakai kaiho* 35:587-597. [J]
 Tuna; Pacific Ocean-northwest.

1933. Fishery conditions on the Pacific coast for skipjack, tuna, and saury. *Suisan gakkwai ho* 5(4):354-369. [J,P]
 Albacore, bigeye tuna, black tuna, skipjack, yellowfin tuna: fishing conditions in relation to surface water temperature.

1937. Notes on the shoal of bonito along the Pacific coast of Japan. *Bull. Jap. Soc. sci. Fish.* 6(1):13-21. Translation in *Spec. sci. Rep.; Fish., U. S. Fish Wildl.* (83). [P]
 Age analysis and size composition of skipjack catches; stock and population relationships; use of condition factor in separating migratory and nonmigratory fish.

AIKAWA, HIROAKI, and M. KATO.

1938. Age determination of fish. I. *Bull. Jap. Soc. sci. Fish.* 7(2):79-88. (Pacific Oceanic Fishery Investigations Translation No. 8. In: *Spec. Sci. Rep.; Fish. U. S. Fish Wildl.* 21). [P]
Germo germo, *Katsuwonus vagans*, *Neothunnus macropterus*, *Thunnus orientalis*: age analysis using vertebrae; age composition of commercial catch; calculated length and weight groups; body condition; growth rate; morphometric data.

ALAEJOS, LUIS.

1931. La pesca marítima en el puerto de Santander. *Notas Inst. esp. Oceanogr. Ser. II*, No. 56:8, 22-23, 30-31.
Thunnus thynnus: statistics for 1920-30; Atlantic Ocean.

ALVERSON, DAYTON L. and HARRY H. CHENOWITH.

1951. Experimental testing of fish tags on albacore in a water tunnel. *Comm. Fish. Rev.* 13(8):1-7. (Also Separate No. 288). [P]
Germo alalunga: tagging.

ANCIETA C. FELIPE.

1952. El atún de aleta amarilla. *Pesca y Caza* 5:3-22. Lima, Peru. [P]
 Yellowfin tuna: common names, description, systematic position, figure, general distribution; biology and ecology; food, maturity, age and growth; bibliography.

ANDERSON, A. W., W. H. STOLTING, ET AL.

1953. Survey of the domestic tuna industry. *Spec. sci. Rep.; Fish. U. S. Fish Wildl.* 104. XV + 436. [P]
 History of U. S. tuna industry; consumption, world production, processing; importance of tuna to the national interest; govt. assistance to the tuna industry in the U. S. and in competing countries.

ANONYMOUS.

- (1) Current fishery statistics. (C. F. S.) 1929—date proc. (U. S. Fish and Wildlife Service, Washington, D. C.) [P]
 Numbered consecutively regardless of subject. Each consists of a few leaves stapled together. Issued periodically, usually monthly with annual summaries. Statistics are published on these subjects: current fishery trade; landings at various ports; frozen and canned fish; fish meal and oil. The data are later summarized in the Statistical Digest series.
- (2) Statistical Digests. No. 1—date. 1942—date. (U. S. Fish and Wildlife Service, Washington, D. C.) [P]
 Statistical reports on fish and fishery industries. Supplemented by Current Fisheries Statistics releases since the year covered by a compilation is usually several years behind that of the publication date. Continues the Administrative Reports, no. 1-42, 1931-1940, of the former Bureau of Fisheries, and the statistical appendixes to the Commissioner's Report.
- (3) 1914-1953. Pacific Fisherman Yearbook. Seattle, Wash., Consolidated Publishing Company. [P]
 The annual statistical number of Pacific Fisherman, and also monthly issues, contain current information on the tuna fishery.
1932. La pesca del tonno in Tripolitania nel 1931. *Boll. Pesca Piscic. Idrobiol.* 8(1):87-91. Mediterranean; catch statistics.

ANONYMOUS.—Continued

- 1937a. An investigation of the waters adjacent to Ponape. Nanyōchō suisan shikenjō jigyo hōkoku 1, 1923-35: 8 p. (Pacific Oceanic Fishery Investigations Translation No. 12. In: Spec. sci. Rep: Fish. U. S. Fish Wildl. 46). [P].
Report of a general survey covering oceanography, weather, bait fish, skipjack, exploratory longlining, reef fish, sponges, and trochus.
- 1937b. Report of a survey of fishing grounds and channels in Palau 1925-26. Nanyōchō suisan shikenjō jigyo hōkoku 1, 1923-35:27-37. (Pacific Oceanic Fishery Investigations Translation No. 5. In: Spec. sci. Rep: Fish. U. S. Fish Wildl. 42) [P].
Exploratory trolling and livebait fishing for skipjack, information on livebait resources, meteorological information.
1938. Status of the investigation of tuna longline fishing grounds in the South China Sea. Taiwan suisan zasshi. 279:10-19. [J,P].
Albacore, yellowfin tuna, body temperatures, distribution, length-weight data, sexual maturity, stomach contents; figured.
- 1939a. Marked fish. S.—annu. Rep. oceanogr. Invest., Tokyo 65:137 p. [J]
Skipjack: release records of tagged fish.
- 1939b. The skipjack and tuna fisheries. Kaiyō gyogyō 4(5):1-42. [J]
Katsuwonus pelamis; tuna; Pacific Ocean, northwest.
- 1941a. Marshall Islands fishery investigations 1926-37. Nanyōchō suisan shikenjō jigyo hōkoku 1, 1923-35: 5 p. (Pacific Oceanic Fishery Investigations Translation No. 31. In: Spec. sci. Rep: Fish. U. S. Fish Wildl. 47). [P].
Results of exploratory longlining for tuna in the Ralik and Ratak chains.
- 1941b. Pacific skipjack indigenous to Sulu Sea. Nanyōchō suisan, 7(5):55. [J,P].
Distributional note; spawning.
- 1941c. A tuna survey of Palau waters (late 1940). Nanyōchō suisan jōhō 5(4):2-4. (Pacific Oceanic Fishery Investigations Translation No. 24. In: Spec. sci. Rep: Fish. U. S. Fish Wildl. 42). [P]
Results of experimental longline fishing and oceanographic observations at Palau in 1940.
1942. Report of a survey of the tuna fishery in Palau waters. Nanyōchō suisan jōhō 6(1): 10-13. (Pacific Oceanic Fishery Investigations Translation No. 4. In: Spec. sci. Rep:

ANONYMOUS.—Continued

- Fish. U. S. Fish Wildl. 42). [P].
Oceanographic data and results of exploratory fishing at Palau.
1945. Fishery resources of the United States. U. S. Senate, 79th Congress, 1st Session. Senate Document 51:39-42. [P].
Facts and figures on tuna resources of the world: yellowfin, skipjack, bluefin, albacore, bonitos; proportion of west coast tuna catch taken off U. S. coast and south of U. S. during development of tuna fishery (1911-17, 1918-26, 1927-36, 1937-45); percentage of each kind of tuna in catch during different periods of development of west coast tuna fishery for same periods.
1947. Yearbook of fisheries statistics, F. A. O. Rome. [P].
First issue 1947, and two since, covering 1948-49 and 1950-51. World statistics in tons on all fish, given in English, French, and Spanish. Tuna, true mackerels, and similar species are in a single grouping; species not given separately. Four main divisions: (1) catch, (2) utilization, (3) external trade, (4) fishing craft.
- 1949a. The commercial fish catch of California for the year 1947 with an historical review, 1916-1947. Fish. Bull., Sacramento 74. [P].
Pages 11-27 on tunas: yellowfin, skipjack, bluefin, albacore. Statistics in pounds and percentage of catch for each. An Annual Bulletin is published.
- 1949b. General aspects of the world's tuna fisheries. Fish. Bull. F.A.O. 2(4):82-105. [P].
Statistics on tuna landings, prices.
1952. Tuna imports. U. S. Senate, 82nd Congress, 2nd Session. Committee on Finance Hearings on House Resolution 5693. 422 p. [P].
Proposed legislation to amend the Tariff Act of 1930 to impose certain duties upon the importation of tuna.
- 1953a. First albacore from South Australia? Fish. News Lett. Aust. 12(5):3. [P]
Reports troll capture of a 9½-lb. albacore (*Thunnus germon*) by research ship *Dervent Hunter* about 50 miles south of Cape Wiles, near Port Lincoln, South Australia.
- 1953b. Skipjack and tuna schools recorded by the echo sounder. Tōkai daigaku suisan gijutsu sōsho 1:17 p. [J,P]
Echo sounder traces of skipjack, bigeye, and albacore schools figured; notes on vertical distribution and schooling habits.

- ARAI, YŌRO, and KŌICHI MATSUMOTO.
1953. On a new sporozoa, *Hexacapsula neothunni* gen. et. sp. nov., from the muscle of yellowfin tuna, *Neothunnus macropterus*. Bull. Jap. Soc. sci. Fish. 18(7):293-298. [J,E,P].
Describes and figures a parasite found in the flesh of yellowfin tuna from the Tokyo fish market.
- ARCIDIACONO, F.
1935. Contributo alla conoscenza della pesca dell'alalonga nel basso Tirreno e nell'Ionio. Boll. Pesca Piscic. Idrobiol. 11(2):323-337.
Thunnus germo, Mediterranean Sea.
- ARICÒ, FRANCESCO, and SEBASTIANO GENOVESE.
1953. Sui caratteri biometrici del tonno (*Thunnus thynnus* L.) tirrenico. Boll. Pesca Piscic. Idrobiol. 8(n.s.), Fasc. 1:5-46.
Biometrics; Mediterranean Sea.
- ASAKAWA, SUEZŌ, EIJŪ NOGUCHI, and KŌICHI MIMOTO.
1953. Studies on the preservation of high-seas catches. I. Biochemical studies of tunas and spearfishes. In Contrib. Nankai reg. Fish. Res. Lab. 1:89 p. [J,P].
Changes in external coloration, flesh color, pH, body temperature, rigor mortis, and chemical composition of yellowfin and big-eye tuna after death under various treatments; effects of killing fish by electric shock.
- ASANO, NAGAO.
1939. Food of the albacore, *Germo germo* (Lacépède). Nanyō suisan jōhō 3(7):10-11 [J,P].
Note on stomach contents of one 23 kg. albacore; *Auxis* sp., recorded as food.
- AUFFRET, C.
1931. La pêche des thons et des pélamides sur les côtes algériennes. Bull. Sta. aq., Castiglione 1930 (1):75-116.
Tuna, Africa; Mediterranean Sea; *Katsuwonus pelamis*.
- BAHR, KLAUS.
1952. Untersuchungen über den roten Thun (*Thunnus thynnus* L.) in der Nordsee. Ber. dtsh. Komm. Meeresforsch. 13(1):64-78. [P].
Distribution; length-weight relationship.
- BAN, YOSHINORI.
1941. Search for southern tuna fishing grounds. Nanyō suisan 7(9):10-21. (Pacific Oceanic Fishery Investigations Translation No. 13. In: Spec. sci. Rep: Fish, U. S. Fish Wildl. 48). [P].
Yellowfin tuna; South Seas, fishing conditions correlated with oceanography; stomach contents, age analysis; sexual maturity.
- BARNARD, K. H.
1948. Further notes on South African marine fishes. Ann. S. Afr. Mus. 36:341-406.
Neothunnus albacora (Lowe), p. 378-380; synonymy, description, plate.
- BARNHART, PERCY.
1936. Marine fishes of Southern California. Berkeley, Univ. of Calif. Press, p. 36-37. [P].
Auxis thazard, *Katsuwonus pelamis*, *Germo alalonga*, *Neothunnus macropterus*, *Thunnus thynnus*; description, distribution, English common names, figures.
- BATES, DONALD H., JR.
1950. Tuna trolling in the Line Islands in the late spring of 1950. Fish. Leaflet 351:32. [P].
Description of gear, trolling operations and results; *Neothunnus macropterus* and *Katsuwonus pelamis*: catch per unit-of-effort.
- BEEBE, W.
1936. Food of the Bermuda and West Indian tunas of the genera *Parathunnus* and *Neothunnus*. Zoologica, N. Y., 21:195-205.
Parathunnus atlanticus (Lesson), *Neothunnus argentivittatus* (Cuv. and Val.): tables of the food found in stomachs.
- BEEBE, W., and J. TEE-VAN.
1936. Systematic notes on Bermudian and West Indian tunas of the genera *Parathunnus* and *Neothunnus*. Zoologica, N. Y., 21:177-194.
Parathunnus atlanticus, *Neothunnus argentivittatus*: synonymy, taxonomic notes, range, description of Bermuda and West Indian specimens.
- BELLOC, G.
1935. La pêche du thon blanc ou germon. Mém. Off. Pêches Marit., Sér. Spéc 10(2):118-126.
Germo alalonga.
- BELLÓN, LUÍS, and E. BARDÓN DE BELLÓN.
1949. Algunos datos sobre los "Thunnidae" de Canarias. Bol. Inst. esp. Oceanogr. 19:1-28.
Parathunnus obesus: biometric study.
- BERG, LEO S.
1947. Classification of fishes both recent and fossil. Ann Arbor, Michigan, J. W. Edwards Co., p. 491-492. [P].
Anatomy and classification of Thunniformes.
- BIGELOW, HENRY B., and WILLIAM C. SCHROEDER.
1953. Fishes of the Gulf of Maine. First revision. Fish. Bull., U. S. 53(74):1-577. [P].
Euthynnus pelamis, *Euthynnus alleteratus*, *Sarda sarda*, *Thunnus thynnus*: descriptions, figures, colors, size, habits, general range, occurrence in the Gulf of Maine.

BINI, GIORGIO.

1931. Rapporto sulla crociera di pesca del tonno compiuta a bordo del piropeschereccio "Orata" nell' Atlantico. Boll. Pesca Piscic. Idrobiol. 7(1):57-90.

Fishing methods and gear; Atlantic Ocean; *Neothunnus albacora* and *Parathunnus obesus* of the Canary Is.: measurements.

1933. La pesca del tonno con l'amo. Boll. Pesca Piscic. Idrobiol. 9(5):769-781.

Tuna; fishing methods and gear.

1952. Osservazioni sulla fauna marina delle coste del Chile e del Peru con speciale riguardo alle specie ittiche in generale ed ai tonni in particolare. Boll. Pesca Piscic. Idrobiol. Anno XXVIII = Vol. VII (Nuova serie), No. 1:11-60.

[P]

Distribution: *Neothunnus macropterus*, *Katsuwonus pelamis*, *Sarda chilensis*, *Thunnus germo*; *N. macropterus*: reproduction, young, populations, migration, figure, oceanographic and fishing conditions correlated; bibliography.

BLACKBURN, M., and G. W. RAYNER.

1951. Pelagic fishing experiments in Australian waters. Tech. Pap. Commonw. sci. ind. Res. Organ. Div. Fish., Melb. 1:7-8. [P]

Live-bait fishing method using yellowtail (*Trachurus declivis*) to capture *Katsuwonus pelamis*, *Thunnus maccoyii*.

BOESEMAN, M.

1947. Revision of the fishes collected by Burger and von Siebold in Japan. Zool. Meded. 28:91-94.

Thunnus macropterus, *T. orientalis*, *T. pelamys*, *T. sibi*, *T. thunnina*: description; synonymy.

BONAMICO, GIULIO.

1933. Per la biologia del tonno. Osservazioni sui tonni dello Stretto di Messina. Corr. Pesca 2/3:2-3; 4/5:3-4. Rome.

Thunnus thynnus, Mediterranean Sea.

BONHAM, KELSHAW.

1946. Measurements of some pelagic commercial fishes of Hawaii. Copeia 1946(2):81-84.

Katsuwonus pelamis: length-weight data and relationship; length frequencies of *Neothunnus macropterus*; lengths of *Euthynnus yaito*.

BOUXIN, J., and R. LEGENDRE.

1936. La faune pélagique de l'Atlantique recueillie dans des estomacs de Germons au large du Golfe de Gascogne. Deuxième Partie: Céphalopodes. Ann. Inst. Océanogr. 16:1-99.

Germo alalunga: food; Atlantic Ocean.

BROCK, VERNON E.

1938. A new tuna record from Washington. Copeia 1938(2):98. *Thunnus thynnus* recorded; Pacific Ocean-northeast.

1939. Occurrence of albacore, *Germo alalunga*, in mid-Pacific. Copeia 1939(1):47.

Germo alalunga: distribution; Pacific Ocean-northeast.

1943. Contribution to the biology of the albacore (*Germo alalunga*) of the Oregon coast and other parts of the North Pacific. Stanf. ichthyol. Bull. 2(6):199-248.

Age and size composition; growth; spawning; sex ratio; length-frequency data; population analysis.

1949. A preliminary report on *Parathunnus sibi* in Hawaiian waters and a key to the tunas and tuna-like fishes of Hawaii. Pacif. Sci. 3(3):271-277. [P]

P. sibi: description, morphometric data; feeding habits. *Aucis thazard*, *Euthynnus yaito*, *Germo alalunga*, *Katsuwonus pelamis*, *Kishinoella rara*, *Neothunnus macropterus*, *Parathunnus sibi*, *Thunnus orientalis*, *T. thynnus*: key.

CALIFORNIA. DEPT. OF FISH AND GAME,
MARINE FISHERIES BRANCH.

Monthly report, tuna and other species. [P]

Annual report, tuna and other species. [P]

Statewide receipts and case pack statistics.

CALIFORNIA. DEPT. OF FISH AND GAME,

Fish bulletins 15, 20, 30, 44, 49 contain statistics on the annual catch for the years 1926-1935.

CARLSON, CARL B.

1951. Exploratory fishing for the little tuna, *Euthynnus alletteratus*, off the Atlantic coast of the United States. Proc. Gulf and Caribbean Fish. Inst. 1951:89-94. [P]

E. alletteratus: distribution, food, size distribution, maturity; trolling and purse seining.

CERQUETELLI, L.

1936. Diritto esclusivo di pesca del tonno spettante al commune di Gallipoli (studio storico giuridico). Boll. Pesca Piscic. Idrobiol. 12:401-414.

Thunnus thynnus: Mediterranean Sea, laws and legislation.

CHABANAUD, PAUL.

1930. Sur l'aisselle de la pectorale de divers poissons Scombroïdes. Bull. Soc. zool. Fr. 55:142-150. [P].

Euthynnus yaito Kish., *E. alletteratus* Raf., *Thunnus thynnus* L.: descriptions, anatomy.

CHAPMAN, WILBERT M.

1946. Observations on tuna-like fishes in the tropical Pacific. Calif. Fish Game 32(4):165-170. [P]

Euthynnus alletteratus, *Katsuwonus pelamis*, *Neothunnus macropterus*: recorded, food of *N. macropterus* noted, numbers and availability of baitfish in island areas, recommendations as to type of vessels and gear needed.

CHEVEY, PIERRE.

- 1932a. Inventaire de la fauna ichtyologique de l'Indochine. Notes Sta. marit. Cauda 19:26.

Euthynnus yaito: listed.

- 1932b. Poissons des campagnes du "de Lanessan" (1925-1929). Trav. Inst. océanogr. Indochine 4:113-115.

Euthynnus yaito: synonymy, distribution, description; Indo-Chinese common names; figure of specimen and scales.

1934. Revision synonymique de l'oeuvre ichtyologique de G. Tirant. Notes Sta. marit. Cauda 7:46.

Thynnus thunnina listed by Tirant re-named *Euthynnus yaito*.

CHIBA PREFECTURAL FISHERIES EXPERIMENT STATION.

- 1936a. Investigation of skipjack fishing grounds. Chiba-ken suisan shikenjō jigyō hōkoku (1934):1-12. [J,P]

Japan: albacore and skipjack fishing conditions in relation to water temperature.

- 1936b. Investigation of tuna fishing grounds. Chiba-ken suisan shikenjō jigyō hōkoku (1934):13-19. [J,P].

Fishing results at 37 stations longlined at 30°-35°N., 154°-170°E. in Feb. 1935; records of capture of albacore, bigeye, yellowfin, black tuna, and skipjack.

CHIBA PREFECTURAL FISHERIES EXPERIMENT STATION, KATSUURA BRANCH.

- 1937a. Investigation of skipjack fishing grounds. Chiba-ken suisan shikenjō Katsuura bunjō jigyō hōkoku (1935):1-9. [J,P]

Japan: skipjack catch in relation to water temperature.

- 1937b. Investigation of tuna fishing grounds. Chiba-ken suisan shikenjō Katsuura bunjō hōkoku (1935):14-19. [J, P]

Results of four albacore longlining cruises at 28°-38°N., 156°-175°E. from Oct. 1935-Feb. 1936; description of gear, operational data, catch, water temperatures to 200 m.

- 1938a. The skipjack fishery. Chiba-ken suisan shikenjō Katsuura bunjō jigyō hōkoku (1936):20-25. [J, P]

CHIBA PREFECTURAL FISHERIES EXPERIMENTAL STATION, KATSUURA BRANCH.—Continued

Japan: skipjack catch in relation to water temperature.

- 1938b. Investigation of tuna fishing grounds. Chiba-ken suisan shikenjō Katsuura bunjō jigyō hōkoku (1936):20-25. [J,P]

Results of five albacore longlining cruises at 30°-35°N., 144°-173°E. in Nov. 1936-Feb. 1937; operational data, catch rates, water temperatures to 200 m; 1936 tuna landing statistics for the prefecture.

- 1941a. Albacore fishery. Chiba-ken suisan shikenjō Katsuura bunjō jigyō hōkoku (1938):1-21. [J, P]

Results of participation in cooperative summer albacore longlining explorations, three cruises to 28°-43°N., 175°E.-175°W., May-Aug. 1938; description of gear, operational data, finances, catch and prices, with water temperatures and specific gravities to 200 m.

- 1941b. The skipjack fishery. Chiba-ken suisan shikenjō Katsuura bunjō jigyō hōkoku (1938):22-25. [J, P]

Japan: albacore and skipjack fishing conditions correlated with water temperature.

- 1941c. Tuna fishery. Chiba-ken suisan shikenjō Katsuura bunjō jigyō hōkoku (1938):29-37. [J, P]

Results of three longlining cruises to 29°-37°N., 155°E.-178°W. in Nov. 1938-Feb. 1939; construction of gear, operational data, water temperatures to 200 m; catch and catch rates, principally albacore and bigeye.

- 1941d. Albacore fishery. Chiba-ken suisan shikenjō Katsuura bunjō jigyō hōkoku (1939):1-13. [J, P]

Results of participation in cooperative summer albacore longlining explorations, three cruises to 32°-45°N., 176°E.-176°W. in May-Oct. 1939; construction of gear, catch and prices; fishing logs with operational data, water temperatures and specific gravities to 200 m; albacore catch rates.

- 1941e. Skipjack fishery. Chiba-ken suisan shikenjō Katsuura bunjō jigyō hōkoku (1939):14-17. [J, P]

Landings of pole-and-line skipjack and albacore in the prefecture by months for 1938 and 1939; discussion of fishing conditions in each month relative to water temperatures.

- CHIBA PREFECTURAL FISHERIES EXPERIMENTAL STATION, KATSUURA BRANCH.—Continued
1941f. Tuna fishery. Chiba-ken suisan shikenjō Katsura bunjō jigyo hōkoku (1939):21-29. [J, P]
Results of three longlining cruises, one for albacore to 30°–36° N., 171°–180° E. in Nov.–Dec. and two for yellowfin, to 2°–6° N., 130°–134° E. in April–May and to 5°–10° N., 131°–134° E. in 10° N., 131°–134° E. in Mar.–Apr. 1940; operational data, water temperatures to 200 m., catch and catch rates for albacore, yellowfin, and bigeye.
- CHILTON, CYRUS H.
1949. "Little tuna" of the Atlantic and Gulf coasts. Fish. Leafl., Wash. 353:1-5. [P]
Euthynnus alletteratus: description.
- CHU, YUANTING T.
1931. Index piscium sinensium. Biol. Bull., Shanghai 1:107-108.
Auxis rochei, *Neothunnus macropterus*: synonymy, distribution.
- CLEAVER, FRED C., and BELL M. SHIMADA.
1950. Japanese skipjack (*Katsuwonus pelamis*) fishing methods. Comm. Fish. Rev. 12(11):1-27. [P]
History, biology and ecology, fishery for bait, fishing gear, fishing techniques, handling of catch, fishing grounds and seasons.
- CLEMENS, W. A., and G. V. WILBY.
1946. Fishes of the Pacific Coast of Canada. Bull. Fish. Res. Bd. Can. 48:164-167.
Katsuwonus pelamis, *Thunnus alalunga*: description, distribution, food, records of capture in Canadian Pacific waters, figured.
- CONNER, G.
1930. The five tunas and Mexico. Fish. Bull., Sacramento 20:75-89.
Statistical records concerning the tuna catch and industry.
- CONRAD, M. G.
1937. The brain of the swordfish (*Xiphias gladius*). Amer. Mus. Novit. 900:1-4.
Comparison between brains of *Xiphias*, *Scomber*, *Thunnus*, and *Euthynnus*.
- CONSEIL INTERNATIONAL POUR L' EXPLORATION DE LA MER AND COMMISSION INTERNATIONALE POUR L' EXPLORATION SCIENTIFIQUE DE LA MER MÉDITERRANÉE.
1933. Conférence d'experts pour l'examen des méthodes scientifiques et techniques à appliquer à l'étude des poissons de la famille des Thonidés. Rapp. Cons. Explor. Mer 84:92-103. [P]
Brief reports of discussions of standardization of techniques for tuna biology; *T. thynnus*, *G. alalunga*: nomenclature, systematics, tagging, morphometric measurements, meristic counts, maturity, age and growth, statistics.
- CONSEIL INTERNATIONAL.—Continued
- COPLEY, H.
1947. Fish records and observations. Nat. E. Afr., Nairobi 2:9-10.
Neothunnus macropterus: East African coast.
- CORWIN, GENEVIEVE A.
1930. A bibliography of the tunas. Fish Bull., Sacramento 22:103 p. [P]
Arranged alphabetically by author with brief annotations; covers the literature on tuna through 1929. Has a subject index, and a list of abbreviations used for periodicals cited.
- COWAN, IAN M.
1938. Some fish records from the coast of British Columbia. Copeia 1938(2):97.
Germo alalunga: recorded.
- CRANE, JOCELYN.
1936. Notes on the biology and ecology of giant tuna, *Thunnus thynnus* Linnaeus, observed at Portland, Maine. Zoologica, N. Y., 21:207-212.
Description, food, parasites, sex.
- DE BEAUFORT, L. F., and W. M. CHAPMAN.
1951. The fishes of the Indo-Australian archipelago. Volume 9:215-227. Leiden, E. J. Brill. [P]
Euthynnus pelamis, *Euthynnus alletteratus affinis*, *Thunnus sibi*, *Thunnus macropterus*, *Thunnus tonggol*, *Auxis thazard*. Figured: *Euthynnus alletteratus*, *Thunnus macropterus*.
- DE BUEN, FERNANDO.
1931. El supuesto paso por el Estrecho de Gibraltar del atún en su emigración genética. Rapp. Comm. int. Mer Médit. 6:405-409.
Tuna (*T. thynnus*): reproduction, migration; Mediterranean Sea, Atlantic Ocean.
1930. Ictiología española: Scombriformes y Thunniformes. Bol. Oceanogr. Pesc., Madr. 15(2):33-53. [P]
Key, distribution, Spanish and Basque common names: *Germo alalunga*, *Thunnus thynnus*, *Neothunnus albacora*, *Parathunnus obesus*, *Auxis thazard*, *Euthynnus alletteratus*, *Katsuwonus pelamis*. Systematics, figures.
1932. Formas ontogénicas de peces (Nota primera). Notas Inst. esp. Oceanogr. Ser. II, no. 57:38 p. [P]
Morphometrics and descriptions: *Auxis thazard*, *Sarda sarda*, *Thunnus thynnus*.
1935. Fauna ictiológica. Catálogo de los peces ibéricos: de la planicie continental, aguas dulces,

DE BUEN, FERNANDO.—Continued

pelágicos y de los abismos próximos. Segunda parte. Notas Inst. esp. Oceanogr., Ser. II (89); :91-149. [P]

Synonymy: *Germo alalunga*, *Thunnus thynnus*, *Neothunnus albacora*, *Auxis thazard*, *Euthynnus alletteratus*, *Katsuwonus pelamis*.

1937. Aires de ponte du thon (*Thunnus thynnus* L.). Int. Congr. Zool. 12:2123-2136. [P]
Thunnus thynnus: spawning areas.

DE BUEN, FERNANDO, and F. FRADE.

1932. Clef dichotomique pour une classification rapide des poissons scombriformes. Rapp. Comm. int. Mer Médit. 7 (N.S.):71-74.
Classification, keys.

DE JONG, J. K.

1940. A preliminary investigation of the spawning habits of some fishes of the Java sea. Treubia 17(4):325-326.

Euthynnus alletteratus: frequencies of egg diameter measurements; resorption of eggs noted.

DE LA TOURRASSE, GUY.

1951. La pêche aux thons sur la Côte Basque Française et son évolution récente. Rev. Trav. Off. Pêches marit. 17 (66fasc. 1):42 p. [P]

Thunnus thynnus and *Germo alalunga*: distribution; fishing methods and boat design, trolling and livebait fishing.

DELSMAN, H. C.

1931. Fish eggs and larvae from the Java Sea. Treubia 13(3/4):407-409. Eggs and larvae believed to be those of *Scomber* (Delsman, Treubia 8(3/4):395-399), reidentified as *Thunnus thunnina*.

1933. Tunny in the North Sea. Nature 132(3338):640-641. Short note on the occurrence of *Thunnus thynnus* in the North Sea since 1911.

DELSMAN, H. C., and J. G. F. HARDENBURG.

1934. De Indische zeevischen en zeevisscherij. Bibl. Ned. ind. nat. Ver. 6:330-343.

Euthynnus alletteratus, *E. pelamys*, *Neothunnus macropterus*, *N. rarus*: description, distribution, key, Malayan names; spawning of *E. alletteratus* and description of eggs and larvae; spawning of *N. rarus* and description of eggs; food of *E. pelamys*; *E. alletteratus*, and *N. macropterus* figured.

DIEUZEIDE, R.

1930. Sur quelques scombriniens des côtes Algériennes. Bull. Sta. Aquic. Pêche Castiglione, 1929 (2e fasc.):133, 150-151, 159.

Thunnus thynnus: classification.

DIEUZEIDE, R.—Continued

1931. La pêche du thon a la ligne dans la baie de Castiglione. Bull. Sta. Aquic. Pêche Castiglione, 1930 (2e fasc.):107-127.

Fishing gear and methods; *Thunnus thynnus*: Mediterranean.

DOMANTAY, JOSÉ S.

1940a. The catching of live bait for tuna fishing in Mindanao. Philipp. J. Sci. 73(3):337-342. [P]
Description and figures of gear used; mentions 16 species, mostly sardines, anchovies, and small scombroid and carangoid fishes, used as bait.

1940b. Tuna fishing in southern Mindanao. Philipp. J. Sci. 73(4):423-435. [P]

Auxis thazard, *Euthynnus yaito*, *Katsuwonus pelamis*, *Neothunnus itosibi*, *N. macropterus*, *Parathunnus sibi*: distribution, figured; livebait fishing methods, gear, and boats.

DONTCHEFF, Y., and R. LEGENDRE.

1948. Thon blanc ou germon. Composition chimique et valeur alimentaire du germon. Rev. Trav. Off. Pêch. marit 11(44 fasc.4):447-462.

Thunnus germo: chemical analysis.

DUNG, DOROTHY I. Y., and WILLIAM F. ROYCE.

1953. Morphometric measurements of Pacific scombrids. Spec. sci. Rept: Fish. U. S. Fish Wildl.: 95. [P]

Morphometric data on: *Neothunnus macropterus*, *Parathunnus sibi*, *Germo alalunga*, *Katsuwonus pelamis*, *Thunnus thynnus*, *Thunnus orientalis*, *Thunnus maccoyii*, *Kishinoella tonggol*, *Euthynnus affinis*, *Gymnosarda nuda*.

ECKLES, HOWARD H.

1949a. Fishery exploration in the Hawaiian Islands (August to October 1948, by the vessel *Oregon* of the Pacific Exploration Company). Comm. Fish. Rev. 11(6):1-9. [P]

Euthynnus yaito, *Katsuwonus pelamis*, *Neothunnus macropterus*: recorded; *K. pelamis* and *N. macropterus*: figured.

1949b. Observations on juvenile oceanic skipjack (*Katsuwonus pelamis*) from Hawaiian waters and sierra mackerel from the eastern Pacific. Fish. Bull., U. S. 51(48):245-250. [P]

Katsuwonus pelamis: anatomy, descriptions, figures and records of capture of juveniles; spawning; juveniles noted in stomachs of adults.

EGO, KENJI, and TAMIO OTSU.

1952. Japanese tuna-mothership expeditions in the western equatorial Pacific Ocean, June 1950 to June 1951. Comm. Fish. Rev. 14(6):1-19. [P]

Catch statistics, prices.

EHRENBAUM, E.

1934. Thunfische in den nordeuropäischen Gewässern. *Fischmarkt* 2(5):116-119. Cuxhaven.
Thunnus thynnus: migration, catch statistics.

ESPENSHADE, ADA V.

1948. Japanese fisheries production, 1908-1946. *Fish. Leafl., Wash.* 279:40 p. [P]

Production of important species of fish in coastal waters (metric tons): bonito (*katsuo*), tuna (*maguro*). Also chart showing pre-war areas fished for tuna; table showing production of important species from offshore fisheries: bonito, tuna.

FARINA, LUIGI.

- 1931a. L'attuale crisi dell' industria delle tonnare, cause e remidi. *Boll. Pesca Piscic Idrobiol.* 7(5):752-9.

Mediterranean; statistics on trap catches.

- 1931b. Remarques sur les madragues des côtes françaises de l'Afrique du Nord. *Bull. Soc. océanogr. Fr.* 11(62):1115-6.

Fishing gear and methods: traps; Mediterranean; Atlantic Ocean.

FEDERATION OF JAPAN TUNA AND BONITO FISHERIES COOPERATIVE ASSOCIATIONS.

- 1951a. The present condition of the tuna fisheries. *Katsuo to maguro* 16:2-10. (In: *Spec. sci. Rep. Fish U. S. Fish Wildl.* 79) [P]

Statistical tables on catch through 1949, size and composition of the fleet, number of fishermen, mothership operations, imports and exports.

- 1951b. The 1950 catch. *Katsuo to maguro* 19:2-8. [J, P]

Statistics on tuna catch, size and composition of the livebait and longline fleets, average annual catch per vessel ton, comparisons with earlier years; mothership operations.

1952. The present condition of the tuna fisheries. *Katsuo to maguro* 26:2-12. [J, P]

Tables of statistics on tuna catch, fleet, prices, exports, featuring 1947-50 average values.

- 1953a. The 1952 tuna catch. *Katsuo to maguro* 37:2-8. [J, P]

Tables of statistics on catch of longline and livebait fisheries, catch per vessel ton, mothership operations, exports and imports.

- 1953b. The present condition of the tuna fisheries. *Katsuo to maguro* 39:2-13. [J, P]

Strength and composition of fleet, number of fishermen, catch statistics, catch

FEDERATION OF JAPAN TUNA.—Continued

per vessel ton, price trends, operating costs, mothership operations, imports and exports; statistics through 1952.

FERREIRA, ERNESTO.

1932. La pesca dell' albacora nelle Azzore. *Note Ist. Biol. mar. Rovigno*, No. 1.

Thunnus germo: fishing methods and gear, Atlantic Ocean.

FICK, H.

1937. Der Fang von Thunfischen und Heringshaien. *Fischmarkt* 5(1).

Thunnus thynnus: North Sea.

FISH, MARIE P.

1948. Sonic fishes of the Pacific. *Tech. Rep. Woods Hole oceanogr. Inst.* 2:87-91. [P]

Auxis thazard, *Euthynnus*, *Germo alalunga*, *Katsuwonus pelamis*, *Neothunnus macropterus*, *Thunnus thynnus*: distribution, English common names, synonymy of *K. pelamis*, *G. alalunga*, *T. thynnus*; air bladders of *G. alalunga*, *N. macropterus*, and *T. thynnus* described; Japanese common names of *Euthynnus* and *T. thynnus*; vertical distribution of *Parathunnus mebachi* noted.

FISHERIES SOCIETY OF JAPAN (DAI NIPPON SUISANKAI).

1931. Illustrations of Japanese aquatic plants and animals. v.1. Tokyo. [P]

Descriptions, figures of: *Katsuwonus vagans*, *Auxis thazard*, *Euthynnus yaito*, *Thunnus orientalis*, *Parathunnus sibi*, *Neothunnus macropterus*, *Germo germo*, *Sarda orientalis*.

FITCH, JOHN E.

1950. Notes on some Pacific fishes. *Calif. Fish Game* 36(2):65. [P]

Stomach contents of *Neothunnus macropterus*.

1953. Extensions to known geographical distributions of some marine fishes on the Pacific coast. *Calif. Fish Game* 39(4):539-52. [P]

Euthynnus yaito: first record from the American Pacific coast.

FLETT, A.

1944. A report on livebait fishing for tuna in Australia. *J. Commonw. sci. industr. Res. Organ.* Aust. 17(1):59-64

Tuna - livebait fishing.

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS.

- 1949a. General aspects of the world's tuna fisheries. *Fish. Bull. F. A. O.* 2(4):81-108. [P]

World landings, distribution.

- 1949b. Recommended scientific and common names of important food fishes. A. Scombriformes. *Fish. Div., FAO, UN*, 98 p.

Auxis thazard, *Euthynnus alletteratus*,

FOOD AND AGRICULTURE.—Continued

Germo alalunga, *Katsuwonus pelamis*, *Neothunnus macropterus*, *Thunnus thynnus*: distribution; synonymy, world-wide common names and recommended nomenclature.

FORMOSA GOVERNMENT-GENERAL FISHERIES EXPERIMENT STATION.

1930. Northern oceanographic conditions and skipjack fishing. Taiwan sōtokufu suisan shikenjō suisan shiken hōkoku, kaiyō chōsa (1928):67-70. [J, P]

Fishing conditions in relation to water temperature, specific gravity, and currents.

1931. Northern oceanographic conditions and skipjack fishing. Taiwan sōtokufu suisan shikenjō suisan shiken hōkoku, kaiyō chōsa (1929):28-30. [J, P]

Fishing conditions in relation to water temperature, specific gravity, and currents.

1932. Northern oceanographic conditions and skipjack fishing. Taiwan sōtokufu suisan shikenjō suisan shiken hōkoku, kaiyō chōsa (1930):10-11. [J, P]

Fishing conditions in relation to water temperature, specific gravity, and currents.

1933a. Oceanographic conditions and skipjack fishing in northern Formosa. Taiwan sōtokufu suisan shikenjō jigyo hōkoku, kaiyō chōsa (1931):13-15. [J, P]

Fishing conditions in relation to currents, surface water temperature, and specific gravity.

1933b. Experimental fishing and investigation in southern waters by the *Shonan Maru*. Taiwan suisan shikenjō jigyo hōkoku, gyorōbu (1931):1-50. [J, P]

Yellowfin tuna: Indo-Pacific region; length-weight data, fishing conditions in relation to oceanography and weather, catch per unit of effort, distribution, stomach contents.

1934. Oceanographic conditions and skipjack fishing in northern Formosa. Taiwan sōtokufu suisan shikenjō jigyo hōkoku, kaiyō chōsa (1932):10-12. [J, P]

Fishing conditions in relation to currents, surface water temperature, and specific gravity.

FORTUNIĆ, V.

1930. Crtica o ribarstvu uopće, a nada sve u području bivše republike dubrovačke. 82 p.

Fishing methods and gear, Adriatic Sea.

FOWLER, HENRY W.

1931. The fishes of Oceania. Supplement 1. Mem. Bishop Mus. 11(5):325. [P]

Euthynnus alletteratus, *E. pelamis*, *Germo alalunga*, *G. macropterus*, *G. sibi*, *Thunnus thynnus*: listed, synonymy of *G. macropterus*.

1933. Description of a new long-finned tuna (*Semathunnus guildi*) from Tahiti. Proc. Acad. nat. Sci. Philad. 85:163-164.

Descriptions of a new genus *Semathunnus* and new species, *Semathunnus guildi*; *Semathunnus* distinguished from *Neothunnus*.

1934. The fishes of Oceania. Supplement 2. Mem. Bishop Mus. 11(6):400. [P]

Euthynnus pelamis, *Semathunnus guildi*, *S. itosibi*, *Thunnus orientalis*: listed, synonymy.

1936. A synopsis of the fishes of China. VI. The mackerel and related fishes. Hongkong Nat. 7:61-80, 186-202.

Thunnus thynnus, *Neothunnus macropterus*, *Auxis thazard*, keys, description, synonymy.

1938. The fishes of the George Vanderbilt South Pacific Expedition, 1937. Monogr. Acad. nat. Sci. Philad. 2:31-33, 253, 277.

Auxis thazard, *Euthynnus lineatus*, *E. pelamis*: description, synonymy: *Auxis thazard*, *E. alletteratus*, *E. lineatus*, *E. pelamis*, *Germo germo*, *Neothunnus macropterus*, *Parathunnus sibi*, *Thunnus thynnus*: recorded from Pacific.

1944. Results of the Fifth George Vanderbilt Expedition (1941). Monogr. Acad. nat. Sci. Philad. 6:349, 373-4, 378, 498.

Auxis thazard, *Euthynnus lineatus*, *Katsuwonus pelamis*, *Thunnus thynnus*: records of capture; synonymy. Pacific records of *A. thazard*, *E. alletteratus*, *E. lineatus*, *Germo alalunga*, *K. pelamis*, *Neothunnus argentivittatus*, *Thunnus thynnus*; description of *T. thynnus*; figure of *E. lineatus*.

1949. The fishes of Oceania. Supplement 3. Mem. Bishop Mus. 12(2):73-74. [P]

Auxis thazard, *Euthynnus wallisi*, *Katsuwonus vagans*, *Neothunnus macropterus*, *Parathunnus sibi*: listed, synonymy.

FRADE, F.

1930a. Anomalies chez le thon rouge. Bull. Soc. portug. Sci. nat. 11(1):1-5. [P]

Describes abnormal structures or formations in swim-bladder and head of *Thunnus thynnus*.

FRADE, F.—Continued

- 1930b. L'anomalie faciale du thon rouge et son importance pour l'étude des migrations. Bull. Soc. portug. Sci. nat. 11(2):7-10. [P]

Discusses a certain anomaly, consisting of grooves on the side of the head, among red tunnies on the Portuguese coast.

- 1931a. Données biométriques pour l'étude du thon rouge de l'Algarve. Bull. Soc. portug. Sci. nat. 11(7):89-130. [P]

Comparison of Atlantic and Tunisian *T. thynnus*.

- 1931b. Données biométriques sur trois espèces de thons de l'Atlantique oriental. Rapp. Cons. Explor. Mer 10:117-126. [P]

Thunnus thynnus, *Parathunnus obesus* Lowe, *Neothunnus albacora* Lowe: morphometrics.

- 1931c. *Neothunnus albacora* (Lowe 1839). Faune ichtyol. Atlan. N. 8.

Description, synonymy, figure.

- 1931d. Sur le nombre des rayons des nageoires et de pinnules branchiales chez le thon rouge Atlantique. Bull. Soc. portug. Sci. nat. 11(10):139-144. [P]

Thunnus thynnus: anatomy.

1932. Sur les caractères ostéologiques à utiliser pour la détermination des Thonidés de l'Atlantique oriental et de la Méditerranée. Rapp. Comm. int. Mer Médit. 7:79-90.

Osteology and specific identification of Thunninae.

1935. Recherches biométriques sur la maturité sexuelle du thon rouge. Trav. Stat. Biol. marit. Lisbonne 41.

Thunnus thynnus: sexual maturity.

- 1937a. Recherches biométriques sur la maturité sexuelle du thon rouge. Int. Congr. Zool. 12:2137-2142. [P]

Thunnus thynnus: sexual maturity.

- 1937b. Recherches sur la maturité sexuelle du thon rouge de l'Atlantique et de la Méditerranée. Bull. Soc. portug. Sci. nat. 12:243-250. [P]

Thunnus thynnus: sexual maturity.

1953. Sur l'état de maturité sexuelle d'un germon pris en Mer Tyrrhénienne. J. Cons. int. Explor. Mer 19(1):72-76. [P]

Thunnus germo: histological study of maturity of Mediterranean albacore, comparison with Atlantic population.

FRADE, F., and F. DE BUEN.

1932. Clef de classification principalement d'après la morphologie interne. Poissons Scombriformes (excepté la famille Scombridae). Rapp. Comm. int. Mer Médit. 7(N.S.):69-70.

Classification; keys; anatomy, external and internal.

FRADE, FERNANDO, and S. MANAÇAS.

1933. Sur l'état de maturité des gonades chez le thon rouge génétique. C. R. Ass. Anat., Apr. 10-12, 1933:1-15. [P]

Thunnus thynnus: figures of ovaries and testes.

FRASER-BRUNNER, A.

1949. On the fishes of the genus *Euthynnus*. Ann. Mag. nat. Hist. 2(20):622-628. [P]

Euthynnus affinis affinis, *E. affinis lineatus*, *E. affinis yaito*: classification, distribution, key, figures, synonymy.

1950. The fishes of the family Scombridae. Ann. Mag. nat. Hist. 3(26):131-163. [P]

Allothunnus fallai, *Auxis thazard*, *Euthynnus affinis*, *E. pelamis*, *Thunnus alalunga*, *T. albacora*, *T. obesus*, *T. thynnus*, *T. tonggol*, *T. zacalles*: classification, description, distribution, key, figures, synonymy.

FUJII, T.

1932. A study of the tunny fishery of Hokkaido. Bull. Sch. Fish. Hokkaido 2(1):32-47 [Je].

Thunnus thynnus: vertical migrations, variation of yield of the fishery in relation to oceanographic changes.

FUKUDA, M., and S. IZUKA.

- 1940a. Experimental tuna fishing. Kumamoto-ken suisan shikenjō jigyō hōkoku 1938:15-20. [J,P]

Bigeye tuna, black tuna: Ryukyu Islands; catch in relation to water temperature.

- 1940b. Skipjack tagging experiment. Kumamoto-ken suisan shikenjō jigyō hōkoku 1938:21. [J,P]

Japan: release records of tagged skipjack.

GALTSOFF, PAUL S.

1952. Staining of growth rings in the vertebrae of tuna (*Thunnus thynnus*). Copeia 1952(2):103-105. [P]

GANSSELE, DAVID, and H. B. CLEMENS.

1953. California-tagged albacore recovered off Japan. Calif. Fish Game 39(4):443.

Thunnus germo: tagging, migration; Pacific Ocean—northeast, northwest.

GENOVESE, SEBASTIANO.

1952. Osservazioni idrologiche eseguite nella tonnara del "Tono" (Milazzo) durante la campagna di pesca 1952. Boll. Pesca Piscic. Idrobiol. 7(n.s.), Fasc. 2:196-206. [P]

Air temperature, water temperature, baro-

GENOVESE, SEBASTIANO.—Continued

metric pressure, salinity, density, oxygen, transparency, currents during the fishing season (May-June) of a north Sicilian tuna trap for *Thunnus thynnus*.

1953. Osservazioni idrologiche eseguite nella tonnara Capo San Marco (Sciaccia) durante la campagna di pesca 1953. Boll. Pesca Piscic. Idrobiol. 8(n.s.), Fasc. 2:241-251. [P]

Meteorological, hydrological data and catch records at a south Sicilian tuna trap; *Thunnus thynnus*: fishing season, average weight, notes on sexual maturity.

GINSBURG, ISAAC.

1953. The taxonomic status and nomenclature of some Atlantic and Pacific populations of yellowfin and bluefin tunas. Copeia 1953(1): 1-10. [P]

Thunnus thynnus, *T. secundodorsalis*, *T. saliens*, *T. albacares*, *T. subulatus*, *T. catalinae*, *T. macropterus*: synonymy.

GODSIL, H. C.

1936. Tuna tagging. J. Cons. int. Explor. Mer 11(1):94-47. [P].

Description and figures of a strap-disk opercular tag used on yellowfin and skipjack off California, together with the tools technique for applying it.

1937. The five tunas. Fish. Bull., Sacramento 49:24-33. [P].

Catch statistics for yellowfin, bluefin, skipjack, albacore, and bonito in and adjacent to California waters.

- 1938a. The high seas tuna fishery of California. Fish. Bull., Sacramento 51:1-40. [P].

Yellowfin and skipjack fishing methods, capture of livebait, handling of catch.

- 1938b. Tuna tagging. Calif. Fish Game 24:245-250.

Skipjack, yellowfin tuna: tagging methods and release records.

- 1938c. Tuna tags. J. Cons. int. Explor. Mer 13(2):217-220. [P]

Reports tagging of approximately 4,000 tuna on American Pacific coasts with no recoveries; results of tests exposing enameled silver tags to sea water.

1945. The Pacific tunas. Calif. Fish Game 31(4): 185-194. [P]

Keys and figures for *Katsuwonus pelamis*, *Sarda lineolata*, *Thunnus thynnus*, *Neothunnus macropterus*, *Thunnus alalunga*, and *Parathunnus mebachi*.

GODSIL, H. C.—Continued

1948. A preliminary population study of the yellowfin tuna and the albacore. Fish Bull., Sacramento 70:90 p. [P]

Neothunnus macropterus, *Thunnus germo*: morphometric data; population relationship of Japanese, Hawaiian, and California fish analyzed; methods of taking morphometric measurements described.

- 1949a. A progress report on the tuna investigations. Calif. Fish Game 35(1):5-9. [P]

Albacore, yellowfin tuna: summary of population studies based on morphometric analysis.

- 1949b. The tunas. In: The commercial fish catch off California for the year 1947 with an historical review 1916-1947. Fish Bull., Sacramento 74:11-27. [P]

Catch statistics and distribution for *Neothunnus macropterus*, *Katsuwonus pelamis*, *Thunnus germo*, *Thunnus thynnus*; fishing methods briefly described.

GODSIL, H. C., and R. D. BYERS.

1944. A systematic study of the Pacific tunas. Fish Bull., Sacramento 60:131 p. [P]

Katsuwonus pelamis, *Neothunnus macropterus*, *Parathunnus mebachi*, *Thunnus germo*, *T. thynnus*: proportional measurements, methods of measurement, internal anatomy, key, figures, description, classification, counts of meristic characters, anatomical differences between species listed; population relationships discussed for all except *P. mebachi*.

GODSIL, H. C., and E. C. GREENHOOD.

1948. Some observations on the tunas of the Hawaiian region. Calif. Div. Fish Game. Bur. Mar. Fish. Mimeogr. Rep.

Albacore, black skipjack, skipjack, yellowfin tuna: distribution.

1951. A comparison of the populations of yellowfin tuna, *Neothunnus macropterus*, from the eastern and central Pacific. Fish Bull., Sacramento 82:1-33. [P]

Comparative study of morphometric measurements of specimens from Hawaii, Palmyra, Fiji, and the Pacific Coast of North America. A study of the homogeneity of the central Pacific stocks is also included.

1952. Observations on the occurrence of tunas in the eastern and central Pacific. Calif. Fish Game 38(2):239-249. [P]

Distribution of *Thunnus germo*, *Neothunnus macropterus*, *Katsuwonus pelamis*.

GODSIL, H. C., and E. K. HOLMBERG.

1950. A comparison of the bluefin tunas, genus

- GODSIL, H. C., and E. K. HOLMBERG.—Continued.
Thunnus, from New England, Australia, and California. Fish Bull., Sacramento 77:1-55. [P]
 Atlantic bluefin (*T. thynnus*), California bluefin (*T. thynnus*), and Australian bluefin (*T. maccoyii*) compared.
- GRAHAM, DAVID H.
 1938. Fishes of Otago Harbour and adjacent seas with additions to previous records. Trans. roy. Soc. N.Z. 38(3):414.
Auxis thazard: listed.
- GREENHOOD, E. C.
 1952. Results of the examination of four small yellowfin tuna, *Neothunnus macropterus*. Calif. Fish Game 38(2):157-163. [P]
 Morphometric and anatomical comparison of three specimens from Hawaiian waters with one from Costa Rica, ranging 216 to 302 mm. in length.
- HADZI, J.
 1934 (?). Što znamo danas o životu tunja. Ribarski Kalendar: 29-35.
 Tuna: Adriatic Sea.
- HART, J. L., and H. J. HOLLISTER.
 1947. Notes on the albacore fishery. Progr. Rep. biol. Stas. Nanaimo and Prince Rupert 71:3-4. [P]
 Albacore catch correlated with water temperature and area; stomach contents.
- HART, J. L., ET AL.
 1948. Accumulated data on albacore (*Thunnus alalunga*). Circ. biol. Stas. Nanaimo and Prince Rupert 12:5 p. [P]
Thunnus alalunga: food, sizes landed in B. C., log records.
- HASEGAWA, KIICHI.
 1937. Progress report of experimental tuna fishing in waters adjacent to Woleai. Nanyō suisan jōhō 1:3-7. (Pacific Oceanic Fishery Investigations Translation No. 7. In: Spec. sci. Rep.: Fish. U. S. Fish Wildl. 46). [P]
 Yellowfin, bigeye, skipjack: longline catches in western Carolines; oceanographic data from the fishing stations.
- HASEGAWA, KIMPEI.
 1938. On a report of investigations of summer albacore. Kaiyō gyogyō 3(4):14-31. [J]
Germo alalunga: Pacific Ocean-northwest.
- HATAI, SHINKISHI, ET AL.
 1941. A symposium on the investigation of skipjack and tuna spawning grounds. Kagaku nanyō 4(1):64-75. (Pacific Oceanic Fishery Investigations Translation No. 16. In: Spec. sci. Rep.: Fish. U. S. Fish Wildl. 18). [P]
 Skipjack: Japan, Indonesian waters, South Seas; eggs, juveniles, food, migration, sexual maturity, method of determining male and female skipjack. Black tuna: Japan, Philippine region; probable spawning areas and season, sexual maturity, eggs. Yellowfin tuna: sexual maturity and probable spawning season in the Indo-Pacific area. Bigeye tuna: juveniles.
- HATAI, SHINKISHI ET AL.—Continued
- HELDT, H.
 1930. Le thon rouge et sa pêche, nouveaux aspects de la question. Bull. Sta. océanogr. Salamm-bô 18:69 p. [P]
Thunnus thynnus: synonymy, anatomy, distribution, food, migrations, tropisms, spawning, growth, catch statistics, bibliography.
1931. *Thunnus thynnus*. In: Faune Ichthyologique de l'Atlantique Nord, No. 7. [P]
 Distribution, figure, description, brief synonymy.
1931. Le thon rouge et sa pêche, éléments d'un nouveau rapport. Bull. Sta. océanogr. Salamm-bô 21:165 p. [P]
Thunnus thynnus: figured, synonymy, morphology, compared with *T. secundo-dorsalis*, biometry, meristic counts, distribution, migrations, spawning, growth, fishing methods, utilization, catch statistics, bibliography.
- 1932a. Repérage des bancs de thons par avion. Notes Sta. océanogr. Salamm-bô 26:12 p. [P]
 Aerial scouting for tuna schools in trap fishery off Moroccan coast; discussion of application of aircraft to tuna fishing and to the study of tuna migrations.
- 1932b. Le thon rouge et sa pêche, rapport pour 1931. Bull. Sta. océanogr. Salamm-bô 29:168 p. [P]
Thunnus thynnus: figured, synonymy, "facial anomaly," meristic counts, distribution, migrations; tags, hooks, and harpoons figured; spawning, growth; fishing methods and gear, especially purse seine and trap; catch statistics, bibliography.
1934. Le thon rouge et sa pêche. Rapp. Comm. int. Mer Médit. 8:187-255.
Thunnus thynnus: food, migration, spawning, statistics, development, bibliography.
1937. Le thon rouge et sa pêche, rapport pour les années 1933, 1934, et 1935 (9^e Rapport). Rapp. Comm. int. Mer Médit. 10:235-315.
Thunnus thynnus: bionomics and fishery.
1938. Le thon rouge et sa pêche. Rapp. Comm. int. Mer Médit. 11:311-358.
Thunnus thynnus: bionomics.

HELDT, H.—Continued

1943. Études sur le thon, la daurade, et les muges. Histoires d'écailles et d'hameçons. Broch. Sta. océanogr. Salammbô 1.
Thunnus thynnus: growth; migration; Mediterranean Sea.
1950. Le germon (*Germo alalunga* Gmelin). Étude biologique d'après l'examen des écailles. Ann. biol., Copenhague 7:63-64. [P]
Scale reading; age and growth.

HERALD, EARL S.

1949. Pipefishes and seahorses as food for tuna. Calif. Fish Game 35(4):329. [P]
Euthynnus yaito, yellowfin tuna: stomach contents.
1951. Pseudofins on the caudal peduncle of juvenile scombroids. Calif. Fish Game 37(3):335-337. [P]
Auxis thazard, *Katsuwonus pelamis*.

HERRE, ALBERT W. C. T.

1932. A check list of fishes recorded from Tahiti. J. Pan-Pacif. Res. Instn. 7(1):3. [P]
Euthynnus alletteratus, *E. pelamis*, *Neothunnus macropterus*: listed.
1933. A check list of fishes from Dumaguete, Oriental Negros, P.I., and its immediate vicinity. J. Pan-Pacif. Res. Instn. 8(4):7. [P]
Euthynnus yaito, *Katsuwonus pelamis*: listed.
1935. A check list of the fishes of the Pelew Islands. Mid-Pacif. Mag. 47(2):164. [P]
Katsuwonus pelamis, *Neothunnus macropterus*: listed.
1936. Fishes of the Crane Pacific Expedition. Zool. Ser. Field Mus. nat. Hist. 21:105-107.
Katsuwonus pelamis, *Neothunnus macropterus*, *Thunnus thynnus*: distribution, synonymy, observations on *N. macropterus* fin lengths.
1940. Distribution of the mackerel-like fishes in the western Pacific north of the Equator. Proc. Pacif. Sci. Congr. 6th, vol. 3:211-215. [P]
Auxis thazard, *Euthynnus alletteratus*, *E. yaito*, *Germo alalunga*, *Katsuwonus pelamis*, *Neothunnus macropterus*, *N. rarus*, *Parathunnus sibi*, *Thunnus thynnus*: distribution.
1953. Check list of Philippine fishes. Res. Rep. U. S. Fish Wildl. 20:977.
Synonymy, range.

HERRE, ALBERT W. C. T., and A. F. UMALI.

1948. English and local common names of Philippine fishes. Circ. U. S. Fish Wildl. Serv. 14:128 p. [P]

HERRE, ALBERT W. C. T., and A. F. UMALI.—Continued

Auxis thazard, *Euthynnus yaito*, *Germo alalunga*, *Katsuwonus pelamis*, *Neothunnus macropterus*: listed.

HIATT, R. W., and V. E. BROCK.

1948. On the herding of prey and schooling of the black skipjack, *Euthynnus yaito* Kishinouye. Pac. Sci. 2(4):297-298. [P]
Euthynnus yaito: observations of herding of scads, *Decapterus sanctae-helenae*, in the Marshall Is.

HIGASHI, HIDEO.

- 1940a. Utilization of fishery byproducts from the South Seas (3). Nanyō suisan 6(7):13-20. [J,P]
Bigeye tuna, black tuna, skipjack, yellowfin tuna: ratio of viscera weight to body weight.
- 1940b. Utilization of fishery byproducts from the South Seas (7). Nanyō suisan 6(12):10-13. [J,P]
Skipjack: ratio of viscera weight to body weight; proportional measurements of various body parts.
- 1941a. Utilization of fishery byproducts from the South Seas (10). Nanyō suisan 7(3):32-39. [J,P]
Katsuwonus vagans, *Neothunnus macropterus*: proportional measurements of various body parts; age analysis.
- 1941b. Utilization of fishery byproducts from the South Seas (14). Nanyō suisan 7(8):36-43. [J,P]
Bigeye tuna, yellowfin tuna: length-weight data; proportional measurements of various body parts; liver figured.
1942. Record of experiments on fishes of the South Seas. Nanyō suisan 8(11):13-27 [J,P]
Katsuwonus vagans, *Neothunnus macropterus*, *Parathunnus sibi*: length-weight data; proportional measurements of various body parts.

HIGASHI, HIDEO, and M. HIRAI.

1948. The nicotinic acid content of fish. Contrib. cent. Fish Sta. Japan (1946-1948) 18:129-132.
Skipjack, yellowfin tuna: nicotinic acid content of various body parts.

HILDEBRAND, SAMUEL F.

1946. A descriptive catalog of the shore fishes of Peru. Bull. U. S. nat. Mus. 189:361-372. [P]
Euthynnus alletteratus, *Katsuwonus pelamis*, *Thunnus macropterus*: classification; description, synonymy; distribution, food, key. *Thunnus germo*, *T. thynnus*: key, occurrences recorded.

HIRATSUKA, HITOSHI, and KAKUJI IMAIZUMI.

1934. Experimental fishing and investigation in southern waters by the Shōnan Maru. Taiwan sōtokufu suisan shikenjo jigyo hōkoku (gyorōbu) 1932:97-164. [J,P]

Yellowfin tuna: Indo-Pacific region; length-weight data, fishing conditions in relation to oceanography and weather; catch per unit of effort; distribution.

HIRATSUKA, HITOSHI, and KIYOJI ITO.

1934. Report on experimental tuna fishing in the Celebes Sea. Taiwan sōtokufu suisan shikenjō jigyo hōkoku 1934:1-28. [J,P]

Yellowfin tuna: length-weight data; fishing conditions in relation to oceanography and weather; catch per unit of effort; distribution.

HIRATSUKA, HITOSHI, and SEICHI MORITA.

1935. Correlation between length and weight of yellowfin tuna. Taiwan suisan zasshi 241: 8-10. (Pacific Oceanic Fishery Investigations Translation No. 26. In: Spec. sci. Rep.: Fish. U. S. Fish Wildl. 22). [P]

Neothunnus macropterus: Celebes Sea; morphometrics.

1936. Correlation between length and weight of yellowfin tuna from the Celebes Sea. Suisan kenkyū shi 31(1):67-68. [J]

Neothunnus macropterus: length-weight relationship; Celebes Sea.

HIRTZ, M.

1933. O tuni i tunolovu. Priroda 23(10):318-320. Adriatic Sea, fishing gear and methods.

HORIGUCHI, YOSHISHIGE, D. KAKIMOTO,
and KENICHI KASHIWADA.

1950. The distribution of inosite in the skipjack (*Katsuwonus pelamis*). Kagoshima sui sen ken hō 1:41-46. [J]

Chemical analysis.

HORIGUCHI, YOSHISHIGE, KENICHI KASHIWADA,
and DAIICHI KAKIMOTO.

1953. Biochemical studies on skipjack, *Katsuwonus vagans*. II. Contents of inorganic substances in pyloric caeca. Bull. Jap. Soc. sci. Fish. 18(7):279-282. [Je,P]

Qualitative and quantitative analysis of the inorganic content of the pyloric caeca; quantitative results compared with those from analysis of muscle tissue.

IEHISA, SATORU.

1939. Catch of tunny in the seas south of Kyushu. Bull. Jap. Soc. sci. Fish. 8(3):143-144. [Je,P]

Thunnus orientalis: catches correlated with water temperature.

IKEBE, KENZŌ.

1938. Progress report on skipjack baitfish holding experiments. Nanyō suisan jōhō 2(4): 2-4. [J,P]

Skipjack live bait fishing: mortality of baitfish (*Spratelloides delicatulus?*) held in pound net at Palau; water temperature, salinity, specific gravity.

1939a-1940. Four papers on the morphometry and age of tropical tunas. Nanyō suisan jōhō 3(10):4 p; 4(1):3 p; 4(2):4 p; 4(5):5 p. Pacific Oceanic Fishery Investigations Translation No. 34. In: Spec. sci. Rep: Fish U. S. Fish Wildl. 22). [P]

Length and weight data on *Neothunnus macropterus*, *Makaira mitsukurii*, *Parathunnus mebachi*, and *Thunnus germon* from Palau, the Marshalls, and Saipan; ages given based on Aikawa's age-size tables.

1939b. On the age of yellowfin taken in Palau waters. Nanyō suisan jōhō 3(10):4-8. [J,P]

Length-weight data, body condition, sexual maturity; age analysis based on size groups according to Aikawa's tables.

1940a. Age and measurements of tunas in Palau waters. Nanyō suisan jōhō 4(1):2-4. [J,P]

Bigeye tuna, yellowfin tuna, striped marlin: length-weight data, condition factor; age analysis of yellowfin tuna based on size groups in accordance with Aikawa's tables.

1940b. Measurements of yellowfin tuna taken south of the Marshall Islands. Nanyō suisan jōhō 4(2):2-5. [J,P]

Length-weight data on longline-caught fish, a total of 75 from 6 stations; age analysis based on size according to Aikawa's tables.

1940c. Measurements of albacore and yellowfin tuna taken in Saipan waters. Nanyō suisan jōhō 4(5):63-67. [J,P]

Lengths and weights (guttled) of 8 albacore and 58 yellowfin taken on longlines north of Saipan; age analysis according to Aikawa's size age tables.

1940d. Investigation of tunas in Palau waters. Nanyō suisan jōhō 4(6):2-4. [J,P]

Catches at 14 longlining stations near 7° N., 134° E.; surface temperatures and currents noted; catch rates for yellowfin and spearfishes combined.

1941a. A survey of tuna fishing grounds in the Marshall and Caroline islands. Nanyō suisan jōhō 5(1):6-9. (Pacific Oceanic Fish-

IKEBE, KENZŌ.—Continued

ery Investigations Translation No. 15 In: Spec. sci. Rep.: Fish. U. S. Fish Wildl. 47) [P]
Catches from exploratory longlining in the Equatorial Countercurrent; currents at 10 fishing stations recorded; catch rates for tunas and marlins combined.

1941b. Measurements of yellowfin tuna from the Equatorial Countercurrent area. Nanyō suisan jōhō 5(3):5-13. [J,P]

Lengths, weights, sex, and estimated age (from Aikawa's tables) of 188 longline-caught yellowfin from 8 stations in southern Carolines waters.

1941c. A contribution to the study of tuna spawning grounds. Nanyō suisan jōhō 5(4):9-12. [J,P]

South Seas: probable tuna spawning grounds; lengths, weights, and estimated ages of 20 juvenile yellowfin, with dates and positions of capture.

1942. Report of the investigation of tuna fishing in the Timor, Arafura, and Banda seas. Nanyō suisan 8(1):29-41. (Pacific Oceanic Fishery Investigations Translation No. 48. In: Spec. Sci. Rep.: Fish. U. S. Fish Wildl. 45) [P]

Bigeye tuna, yellowfin tuna: longline fishing conditions in relation to oceanography; catches and catch rates at 10 stations.

IKEBE, KENZŌ, and TAKESHI MATSUMOTO.

1937. Progress report on experimental skipjack fishing near Yap. Nanyō suisan jōhō 1(4):3-9. (Pacific Oceanic Fishery Investigations Translation No. 6. In: Spec. sci. Rep.: Fish. U. S. Fildl. 46) [P]

Results of 10 days' livebait fishing around Yap: fishing logs; lengths, weights, sex, and condition factor for 83 skipjack; water temperatures and salinities to 200 m. at 8 stations.

1938. Report of a skipjack bait investigation in Saipan waters. Nanyō suisan jōhō 6:2-12. (Pacific Oceanic Fishery Investigations Translation No. 30. In: Spec. sci. Rep.: Fish. U. S. Fish Wildl. 44). [P]

Common names and descriptions of the species used for livebait at Saipan; results of intensive experimental fishing for livebait.

IKEDA, NOBUYA.

1932. The bait problem and the development of our skipjack and mackerel fisheries. Miyagi no suisan 1:9-29. [J]

Katsuwonus pelamis, Pacific Ocean-northwest; livebait fishing.

IKEDA, NOBUYA, and SELJI ANDŌ.

1933. A consideration of skipjack fishing conditions off northeastern Japan in 1930. Gyorō kenkyū-kai kaihō 5. [J]

Katsuwonus pelamis, Pacific Ocean-northwest.

IKEHARA, ISAAC I.

1953. Live-bait fishing for tuna in the central Pacific. Spec. sci. Rep.: Fish. U. S. Fish Wildl. 107:20 p. [P]

Availability and characteristics of live-bait species of the Hawaiian, Line, and Phoenix islands; results of exploratory livebait fishing around these groups; size frequency distribution of yellowfin tuna caught by livebait fishing in Line and Phoenix islands; evaluation of baiting grounds in the area.

IMAI, SADAHIKO.

1950. Studies on flying fishes. 1. On the young of flying fishes eaten by tuna. Kagoshima sui sen ken hō 1:137-148. [J]

Tuna: food.

IMAIZUMI, KAKUJI.

1937. An account of the investigation of tuna fishing grounds in the East Philippine Sea. Taiwan suisan zasshi 271:6-23. [J,P]

Popular account of an exploratory tuna longlining expedition: total catch and catch rates by species for 17 stations; brief remarks on maturity of yellowfin, distribution of catch rates, and oceanographic conditions.

IMAMURA, YUTAKA.

1949. The skipjack fishery. Suisan kōza 6:17-94. (Pacific Oceanic Fishery Investigations Translation No. 32. In: Spec. sci. Rep.: Fish. U. S. Fish Wildl. 49). [P]

Auaxis hira, *A. maru*, *Euthynnus yaito*: Japan; description, distribution, habits. *Katsuwonus pelamis*: Japan; anatomy, description, migration, spawning areas and seasons, food, populations, habits, natural enemies, fishing conditions in relation to oceanography.

1953. The tuna fishery. Suisan kōza 6:104 p. Tōkyō. [J,P]

General account of tuna livebait fishing, purse seining, gillnetting, trolling, and longlining; tables of operating and economic data on Japanese longliners.

INANAMI, YOSHIYUKI.

1940a. Relationship of viscera weight to body weight in yellowfin tuna. Nanyō suisan jōhō 4(2):2-7. [J,P]

Length, weight, body depth, body breadth,

INANAMI, YOSHIYUKI.—Continued

and weight of gills and viscera for 13 large longline-caught yellowfin; percentage of gill-and-viscera weight in body weight calculated.

- 1940b. Oceanography and fishing conditions in the sea area centered on Palau. Nanyō suisan jōhō 4(3):5-7. [J,P]

Bigeye tuna, yellowfin tuna: longline fishing conditions in relation to currents and water color.

- 1940c. Tuna fishing conditions and currents along the eastern coast of the Palau Islands. Nanyō suisan jōhō 4(2):7-10. [J,P]

Bigeye tuna, yellowfin tuna: longline fishing conditions in relation to local currents at 47 stations within 30 miles of the coast.

1941. Report of oceanographic changes and fishing conditions in Palau waters. Nanyō suisan jōhō 5(2):2-6. (Pacific Oceanic Fishery Investigations Translation No. 3. In: Spec. sci. Rep.: Fish. U. S. Fish Wildl. 42) [P]

Describes the effects of a southward shift of the Equatorial Counter-current on oceanographic conditions and on the skipjack fishing at Palau.

- 1942a. Oceanographic conditions and yellowfin tuna fishing grounds in South Sea Islands waters. Nanyō suisan jōhō 6(1):2-5. [J,P]

Location of longline fishing grounds in relation to currents, transparency, water color, and water temperature in the equatorial current system between 130°E. and 170°E. longitude.

- 1942b. Skipjack fishing conditions at Saipan, Truk, and Ponape. Nanyō suisan jōhō 6(1):5-7. [J,P]

Seasonal fluctuations in commercial catch and the size of fish taken.

- 1942c. Small skipjack caught at Truk. Nanyō suisan jōhō 6(1):7. [J,P]

Records and measurements of two juveniles.

- 1942d. Grounds fished by tuna boats operating in the Inner South Seas. Nanyō suisan jōhō 6(1):7-9. [J,P]

Albacore, bigeye, skipjack, yellowfin tuna: fishing conditions in relation to water temperature; seasonal shifts in equatorial longlining grounds at 150°E. to 160°E. longitude.

INOUE, MOTOO.—Continued

1953. Albacore fishing conditions and oceanographic conditions in the 1952-53 longlining season. Tōkai daigaku sangyō kagaku kenkyūsho

INOUE, MOTOO.—Continued

suisan kenkyūbu gyogyō shiryō No. 3:17 p. [J,P]

Thunnus germon: fishing conditions in relation to oceanography, catch per unit of effort; Pacific Ocean—northwest.

ISAWA, TAKAO.

1935. On the tuna of the Japan Sea coast of Hokkaidō. Hokkaidō sui shi junpō 1935:727-731. [J]

Tuna: distribution; Sea of Japan.

IWATE PREFECTURE FISHERIES EXPERIMENT STATION.

- 1953a. South Seas tuna fishing experiment report. 1:44 p. [J,P]

Results of an exploratory longlining trip around 10°N., 170°W. Fishing logs; currents, salinities and water temperatures to 300 m., plankton collections; distribution of catch rates for *N. macropterus*, *P. sibi*, and black marlin; length frequency curves, sex ratios and apparent maturity, notes on stomach contents, catch by branch line number and estimated depth; data on shipboard refrigeration and the prices received from each species landed.

- 1953b. South Seas tuna fishing experiment report. 2:31 p. [J,P]

Results of an experimental longlining trip around 4°N., 175°W. Fishing logs; currents, water temperatures and salinities to 300 m., plankton collections; length frequency distributions for *N. macropterus*, *P. sibi*, and black marlin; catch rates; catch by branch line numbers and estimated depths; prices received for each species landed; sex ratios and apparent maturity.

JAPANESE BUREAU OF FISHERIES.

1933. Report of the southern fisheries investigation for 1931. Bur. Fish. Min. Agr. and For. (1931) 1933:96 p. [J,P]

Results of tuna longlining and purse sein-ing by boats of the training ship Hakuyō Maru in the Celebes Sea and Indian Ocean; shipboard tuna canning experiment; complete logistical and operational data; catch and production (dried fish) of a land-based skipjack fishing operation in Borneo; fishing gear and boats described and figured; yellowfin and bigeye catch, catch rates, weather, and oceanographic data for 19 longline stations; observations of surface schools of skipjack and small yellowfin.

1934. Report of the southern fisheries investigation for 1932. Bur. Fish. Min. Agr. and For.

JAPANESE BUREAU OF FISHERIES.—Continued

- (1932) 1934: 347 p. [J,P]
Results of tuna longlining and purse-seining by boats of the factory ship Haruna Maru (1,500 tons) off the N. coast of Borneo and the W. coast of Sumatra; complete operational data; results of shipboard canning and freezing experiments; descriptions and figures of fishing gear and boats; daily catches by species by each of 8 boats fishing up to 40 baskets of longlines; catch rates given, positions of sets plotted; yellowfin stomach contents (non-quantitative) recorded for 66 samples of up to 29 fish, together with notes on plankton samples from the same stations; graph plotting yellowfin and bigeye catch rates with transparency and water temperature at 0, 100, and 150 meters.
1935. Report of the southern fisheries investigation for 1933. Bur. Fish. Min. Agr. and For. (1933) 1935: 298 p. [J,P]
Results of tuna longlining and purse-seining by boats of the factory ship Haruna Maru (1,500 tons) off south coasts of Sumatra, Java, and the lesser Sundas; complete operational data; shipboard canning and freezing results; fishing logs and catch data for 67 longlining stations; water temperature and specific gravities to 200 m. given as high, low, and average for each of three sections of cruise; total catch rates (all species) given similarly; details of longline and purse seine construction; descriptions of boats used; description of processing techniques; tuna catch comprised yellowfin and bigeye.
1939. Results of encouragement given to the development of albacore fishing grounds during 1938. Bur. Fish., Min. Agr. and For. 1939: 298 p. [J,P]
Detailed results of exploratory albacore longlining by 11 research ships at 28°N.-43°N., 165°E.-165°W. from May to September; track charts and fishing logs; data on surface and subsurface water temperatures and salinities, correlated with catch rates; albacore stomach contents noted; measurement and sex data; catch records also for bigeye, yellowfin, and skipjack.
1940. Results of encouragement given to the development of albacore fishing grounds during 1939. Bur. Fish., Min. Agr. and For. 1940: 173 p. (Translated as Spec. sci. Rep.: Fish. U. S. Fish Wildl. 33). [P]
Detailed results of exploratory albacore longline fishing by 9 research ships at 30°N.-45°N., 163°E.-175°W. from May

JAPANESE BUREAU OF FISHERIES.—Continued

- through October; track charts and fishing logs; data on surface and subsurface water temperatures and salinities, correlated with albacore catch rates; stomach contents noted; measurement and sex data; catch records for bigeye also; data on plankton collections (nonquantitative).
1942. Results of encouragement given to the development of albacore fishing grounds during 1940. Bur. Fish. Min. Agr. and For. 1940: 135 p. [J]
Results of exploratory albacore longlining in the central North Pacific.
- JOUBIN, M. (ED.)
1934. Faune Ichthyologique de l'Atlantique Nord, No. 15. Copenhagen, Andr. Fred Høst and Fils (published for Conseil Permanent International pour l'Exploration de la Mer). [P]
Plates including description, synonymy, geographical distribution of: *Germo alalunga*, *Auxis thazard*, *Katsuwonus pelamis*, *Euthynnus alletteratus*, *Sarda sarda*.
- JUNE, FRED C.
1950a. Preliminary fisheries survey of the Hawaiian-Line Islands area. Part 1. The Hawaiian long-line fishery. Comm. Fish. Rev. 12(1):1-23. [P]
Information on the boat, crew, description of gear, bait, setting the line, fishing areas and depths, amount and efficiency of gear used, catch composition.
- 1950b. The tuna industry in Hawaii. Pan-Amer. Fish. 4(10):11, 19. [P]
Brief description of the skipjack (*Katsuwonus pelamis*) fishery.
- 1951a. Preliminary fisheries survey of the Hawaiian-Line Islands area. Part 2. Notes on the tuna and bait resources of the Hawaiian, Leeward, and Line Islands. Comm. Fish. Rev. 13(1):1-22. [P]
Includes sea conditions, tuna and bait resources, for the Hawaiian Islands, Leeward Islands, Line Islands, and Canton Island.
- 1951b. Preliminary fisheries survey of the Hawaiian Line Islands area. Part 3. The live-bait skipjack fishery of the Hawaiian Islands. Comm. Fish. Rev. 13(2):1-18. [P]
Description and notes on biology of skipjack, development of the fishery, fishing boats and crews, bait, fishing methods, fishing areas and seasons.
- 1952a. Observations on a specimen of bluefin tuna (*Thunnus thynnus*) taken in Hawaiian waters. Pacif. Sci. 6(1):75-76. [P]
Comparison with *Thunnus orientalis*; mor-

JUNE, FRED C.—Continued

phometric measurements and meristic counts of the specimen given.

- 1952b. An "unusual" yellowfin tuna (*Neothunnus macropterus*) from the waters of the northern Line Islands in the central Pacific Ocean. *Copeia* 1952 (3):210-211. [P]

Description of a 24-lb. female which because of its coloration at first appeared to be a bluefin tuna (*Thunnus thynnus*) or *Thunnus maccoyi*. Meristic counts and measurements indicated that it was a yellowfin tuna.

1953. Spawning of yellowfin tuna in Hawaiian waters. *Fish. Bull., U. S.*, 54(77):47-64. [P]
Collection and treatment of ovary samples, description of the ovaries, development of the ova, relation of ovary size to fish size as a measure of maturity, number of ova spawned, spawning season, spawning and the fishing season.

JUNE, FRED C., and J. W. REINTJES.

1953. Common tuna-bait fishes of the central Pacific. *Res. Rep. U. S. Fish. Wildl.* 34:54 p. [P]
Keys and descriptions of families and species of bait fishes; figures; evaluation of tuna bait resources in the central Pacific.

KAFUKU, TAKEICHIRO.

1950. On the dark muscle tissue in fishes. (Rep. No. 1.) The dark muscle tissue of the tunas from the viewpoint of comparative anatomy. *Jap. J. Ichth.*, Tokyo 1(2):89-100. [Je,P]
Tuna: anatomy.

KAGOSHIMA PREFECTURE FISHERIES EXPERIMENT STATION.

- 1930a. Experimental skipjack fishing. Kagoshima-ken suisan shikenjō jigyo hōkoku (1928):1-18. [J,P]

Results of 11 skipjack livebait fishing cruises off southern Japan, the Ryukyus, and northern Formosa from March to June: fishing logs; surface and subsurface water temperatures at fishing stations.

- 1930b. Experimental longline fishing for tuna. Kagoshima-ken suisan shikenjō jigyo hōkoku (1928):18-31. [J,P]

Results of 3 longlining cruises from southern Japan to the Ryukyus between November and February: bigeye, yellowfin, and albacore catches, correlated with tides; surface and subsurface water temperatures at fishing stations; fishing logs.

- 1930c. Experimental fishing by small motor vessels: experimental longline fishing for albacore. Kagoshima-ken suisan shikenjō jigyo hōkoku (1928):54-60.

KAGOSHIMA PREFECTURE FISHERIES EXPERIMENT STATION.—Continued

Results of 2 longlining cruises with a 20-ton vessel in Ryukyu waters in March and April; description of gear; albacore, yellowfin, and bigeye catch, surface and subsurface water temperatures at fishing stations; fishing logs, plots of sets.

- 1931a. Experimental skipjack fishing. Kagoshima-ken suisan shikenjō jigyo hōkoku (1929):1-16. [J,P]

Results of 10 livebait skipjack fishing cruises in Ryukyu waters between March and June; average monthly surface water temperatures for 7 years; commercial fishing correlated with surface temperatures; a few subsurface temperature data; fishing logs.

- 1931b. Experimental longline fishing for tuna. Kagoshima-ken suisan shikenjō jigyo hōkoku (1929):16-30. [J,P]

Results of 4 exploratory tuna longlining cruises in Ryukyu waters from October to January; average monthly water temperatures; catches of yellowfin, albacore, and bigeye tuna recorded with surface and subsurface temperatures at the stations, moon phase and tides, transparency; description of gear; plot of station locations and fishing logs.

- 1932a. Experimental skipjack fishing. Kagoshima-ken suisan shikenjō jigyo hōkoku (1930):1-20. [J,P]

Results of 9 livebait skipjack fishing cruises in Ryukyu waters from March to June; surface water temperature isotherms plotted; fishing logs and plot of station locations.

- 1932b. Experimental longline fishing for tuna. Kagoshima-ken suisan shikenjō jigyo hōkoku (1930):21-28. [J,P]

Results of 7 exploratory tuna longlining cruises in Ryukyu waters from October to February; catches of yellowfin, bigeye, and black tuna recorded with surface and subsurface temperatures at fishing stations; fishing logs and plot of station locations.

- 1932c. Experimental longline fishing for albacore and pole and line fishing for mackerel. Kagoshima-ken suisan shikenjō jigyo hōkoku (1930) 54-59. [J,P]

Results of 3 exploratory longlining stations in Ryukyu waters in March; catch (a total of 3 albacore) recorded with surface and subsurface temperatures on the stations; fishing logs and plot of station locations.

KAGOSHIMA PREFECTURE FISHERIES EXPERIMENT STATION.—Continued

- 1933a. Investigation of skipjack fishing. Kagoshima-ken suisan shikenjō jigyo hōkoku (1931): 1-16. [J,P]

Results of 8 exploratory live-bait skipjack fishing cruises in Ryukyu, Formosan, and Philippines waters from March to June; fishing logs and plots of station locations; surface temperatures discussed, isotherms plotted.

- 1933b. Experimental longline fishing for tuna. Kagoshima-ken suisan shikenjō jigyo hōkoku (1931):16-23. [J,P]

Results of 3 exploratory tuna longlining cruises (23 stations) in Ryukyu waters in October-December; fishing logs and plots of station locations; yellowfin, albacore, and bigeye catch recorded with surface and subsurface temperatures and salinities, transparencies, on the stations; total catch rates averaged by area.

1934. Investigation of skipjack fishing. Kagoshima-ken suisan shikenjō jigyo hōkoku (1932): 1-27. [J,P]

Results of 8 exploratory skipjack live-bait fishing cruises in Ryukyu waters from February to June; fishing logs and plot of station locations; water temperature distribution discussed with data on commercial landings at local ports.

- 1935a. Investigation of skipjack fishing. Kagoshima-ken suisan shikenjō jigyo hōkoku (1933): 1-13. [J,P]

Results of 9 exploratory skipjack live-bait fishing cruises in Ryukyu waters from March to June; fishing logs and plot of station locations; water temperature distribution discussed with data on commercial landings at local ports.

- 1935b. Cooperative South Seas tuna fishing survey. Kagoshima-ken suisan shikenjō jigyo hōkoku (1933):15-21. [J,P]

Results of 4 combination skipjack live-bait and tuna longlining exploratory cruises in the Sulu and Celebes seas by subsidized commercial vessels; catch rates for total tuna, species not recorded.

- 1936a. Investigation of skipjack fishing. Kagoshima-ken suisan shikenjō jigyo hōkoku (1934):1-16. [J,P]

Results of 10 exploratory skipjack live-bait fishing cruises in Ryukyu waters from March to June; discussion of water temperatures and fishing conditions; commercial landings at local ports; lengths and weights of 728 skipjack, average condition factors of samples.

KAGOSHIMA PREFECTURE FISHERIES EXPERIMENT STATION.—Continued

- 1936b. Cooperative southern skipjack fishing experiment. Kagoshima-ken suisan shikenjō jigyo hōkoku (1934):17-21. [J,P]

Results of 4 exploratory skipjack live-bait fishing cruises in the Sulu and Celebes seas by a subsidized commercial vessel; chart of locations fished; notes on feeding and care of live-bait.

- 1936c. Investigation of the migration of important fishes. Kagoshima-ken suisan shikenjō jigyo hōkoku (1934):86-87 [J,P]

Release records of 45 skipjack tagged on the caudal peduncle in Ryukyu waters.

- 1937a. Investigation of skipjack fishing. Kagoshima-ken suisan shikenjō jigyo hōkoku (1935) 1-8. [J,P]

Results of 8 exploratory skipjack live-bait fishing cruises in Ryukyu waters from February to June discussed in relation to surface water temperatures; data on landings at local ports by months; average weights, lengths, and condition factors of ten 50-fish samples; distribution of water temperatures and skipjack fishing grounds recorded and plotted for several years; seasonal and annual variations in size composition of the catch; fishing logs and station plots.

- 1937b. Cooperative southern tuna fishing experiment. Kagoshima-ken suisan shikenjō jigyo hōkoku (1935):9-11. [J,P]

Results of 4 combination skipjack live-bait fishing and tuna longline exploratory cruises to the Sulu Sea; skipjack, yellowfin, and bigeye catches recorded, fishing locations plotted.

- 1937c. Survey of the present condition of the skipjack fishing industry. Kagoshima-ken suisan shikenjō jigyo hōkoku (1935):96-103. [J,P]

Numbers of skipjack vessels by size classes in the prefecture, their equipment and operating regime; economic and financial data on the fishery.

- 1938a. Investigation of skipjack fishing. Kagoshima-ken suisan shikenjō jigyo hōkoku (1936):1-4. [J,P]

Results of 9 exploratory skipjack live-bait fishing cruises in Ryukyu waters from February to July; discussion of water temperature in relation to fishing conditions; monthly skipjack landings at local ports; average lengths and weights of fifteen 20-fish samples; fishing logs and station plot.

KAGOSHIMA PREFECTURE FISHERIES EXPERIMENT STATION.—Continued

- 1938b. Cooperative southern skipjack fishing experiment. Kagoshima-ken suisan shikenjō jigyo hōkoku (1936):7-10. [J,P]
Results of 2 exploratory skipjack fishing cruises in the Celebes and Sulu seas from November to February by a subsidized commercial vessel.
- 1938c. Investigation of the migration of important fishes. Kagoshima-ken suisan shikenjō jigyo hōkoku (1936):89. [J,P]
Release records for 45 skipjack tagged in Ryukyu waters.
- 1939a. Investigation of skipjack fishing. Kagoshima-ken suisan shikenjō jigyo hōkoku (1937):1-3. [J,P]
Results of 7 exploratory skipjack live-bait fishing cruises in Ryukyu waters from March to June; fishing logs and plot of stations; average length and weight of 8 samples of approximately 20 fish; monthly commercial landings at local ports.
- 1939b. Cooperative southern skipjack fishing experiment. Kagoshima-ken suisan shikenjō jigyo hōkoku (1937):7-9. [J,P]
Results (not very detailed) of 10 days' exploratory skipjack live-bait fishing in the Sulu Sea by a subsidized commercial vessel; chart of locations fished.
- 1939c. Investigation of the migration of important fishes. Kagoshima-ken suisan shikenjō jigyo hōkoku (1937):69. [J,P]
Release records of 36 skipjack tagged in Ryukyu waters.
- 1940a. Experimental skipjack fishing. Kagoshima-ken suisan shikenjō jigyo hōkoku (1938):1-3. [J,P]
Results of 9 exploratory skipjack live-bait fishing cruises in Ryukyu waters from March to July; brief discussion of water temperature and fishing conditions; plot of locations fished; monthly commercial landings at local ports; average lengths and weights of 13 samples of 20 fish each.
- 1940b. Cooperative southern skipjack fishing experiment. Kagoshima-ken suisan shikenjō jigyo hōkoku (1938):7-9. [J,P]
Results of 4 exploratory skipjack live-bait fishing cruises to the Sulu Sea from October to February by a subsidized commercial vessel.
- 1940c. Investigation of the migration of important fishes. Kagoshima-ken suisan shikenjō jigyo hōkoku (1938):43. [J,P]
Release records for 20 skipjack tagged in Ryukyu waters.

KAGOSHIMA PREFECTURE FISHERIES EXPERIMENT STATION.—Continued

- 1941a. Investigation of skipjack fishing. Kagoshima-ken suisan shikenjō jigyo hōkoku (1939):1-3. [J,P]
Results of 10 exploratory skipjack live-bait cruises in Ryukyu waters from March to July; fishing log and station plot; brief discussion of water temperature and fishing conditions; average lengths and weights of 8 samples of 20 fish each; monthly commercial landings at local ports.
- 1941b. Cooperative southern skipjack fishing experiment. Kagoshima-ken suisan shikenjō jigyo hōkoku (1939):7. [J,P]
Fishing logs for 3 exploratory skipjack livebait fishing cruises to the Sulu Sea from October to January by a subsidized commercial vessel.

KAKIMOTO, DAIICHI, AKIO KANAZAWA, and KENICHI KASHIWADA.

1953. Biochemical studies on skipjack (*Katsuwonus vagans*). IV. Distribution of amino-acid in pyloric caeca. Bull. Jap. Soc. sci. Fish. 19 (6):729-732. [Je,P]
Chemical analysis.

KAMIMURA, TADAO, and MISAO HONMA.

1953. Biology of the big-eyed tuna, *Parathunnus mebachi* (Kishinouye). I. Length frequency of the big-eyed tuna caught in the North Pacific with special reference to biennial frequency. Contrib. Nankai reg. Fish. Res. Lab. 1, Contrib. 46:18 p. [Je,P]
Analysis of size composition of bigeye landed by longlines from 130°E. to 165°W. north of 26°N. from 1948 through 1953; compared for areas and years; discussion of reproduction, growth, and migration.

KANAGAWA PREFECTURE FISHERIES EXPERIMENT STATION.

- 1951a. Report of South Sea tuna fishing experiments, 1951. 49 p. [J,P]
Detailed results of a longlining cruise to 0°-6°N., 154°-162°E. in January-March: distribution, longline catch rates, relative depth of capture, length frequencies, sex ratios, stomach contents for yellowfin and bigeye tuna. Subsurface water temperatures, salinities; notes on plankton.
- 1951b. Report of work of the Kanagawa Prefecture Fisheries Experiment Station, 1950:1-107. [J,P]
Results of 5 longlining cruises between 5°-38°N. and 150°-175°E. Yellowfin, bigeye, and albacore catch rates, length frequencies, sex ratios, stomach contents (non-quantitative); relative depth of capture; subsurface water temperatures and salini-

KANAGAWA PREFECTURE FISHERIES EXPERIMENT STATION.
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nities, notes on plankton; fishing logs, *N. macropterus* and *P. mebachi* recorded from stomach contents; shipboard refrigeration experiments.

- 1952a. Report of experimental tuna fishing on the eastern grounds by the Sagami Maru. Maguro gyogyō shiken hōkoku 4:21 p. [J,P]

Report of an exploratory longlining cruise in Feb.-Mar. around 32°N., 171°E. Catch rates of albacore and bigeye; average sizes; length frequency distribution of albacore; estimated depth of capture; sex ratios; water temperatures and salinities to 300 m.; fishing correlated with oceanographic conditions. Complete fishing logs.

- 1952b. Report of experimental tuna fishing on the eastern grounds by the Sagami Maru. Maguro gyogyō shiken hōkoku 5:26 p. [J,P]

Report of an exploratory longlining cruise in Feb.-Apr. around 30°N., 175°E. Albacore and bigeye catch rates, sex ratios, length frequency distribution; water temperature and salinities to 300 m., correlated with fishing conditions; catch by branch line number. Complete fishing logs.

KANAI, MOTŌ, and NOBORU KASU.

1938. Report of an investigation of the economics of the Okinawan tuna longline and deep-sea handline fisheries. Okinawa-ken suisan shikenjō hōkoku 1:1-42. [J,P]

History of the fishery, charts of grounds showing expansion, fishing seasons; description and figures of gear and vessels; list of vessels, catch statistics; economics of the fishery: costs of gear, provisions, bait, fuel.

KANAMURA, MASAMI, and KAKUJI IMAIZUMI.

- 1936a. Report of experimental tuna longlining east of Formosa. In Report of experimental fishing by the Shonan Maru in 1935. Taiwan sōtokufu suisan shikenjō shuppan 3:165-202. [J,P]

Results of fishing at 21°-23°N., 121°-126°E. in Nov.-Dec. Gear dimensions, station plot, fishing log, weather, surface and subsurface temperature and salinity, transparency, water color; yellowfin, bigeye: catch rates, depth of capture; body temperature, sex, maturity, length, weight of 25 yellowfin and 3 bigeye; shark damage rate; tuna catch and water temperature correlated.

- 1936b. Fishing conditions for tuna longline boats based at Takao. Taiwan sōtokufu suisan shikenjō shuppan 3: 203-207. [J,P]

Operational data (average cruises per

KANAMURA, MASAMI, and KAKUJI IMAIZUMI.—Cont.

season, Oct.-May, average fishing effort, average catch per cruise by species) for 7 commercial boats fishing the Celebes, Sulu, and S. China Seas; plots by 1° squares of catch rates for yellowfin and bigeye.

KANAMURA, MASAMI, and HARUO YAZAKI.

- 1940a. Investigation of tunā longline fishing grounds in the East Philippine Sea. In Report of fishing ground investigations by the Shonan Maru in 1937. Taiwan sōtokufu suisan shikenjō shuppan 21:1-65. [J,P]

Results of exploratory longlining at 3°-20°N., 123°-131°E. in June-Sept. Fishing log, track chart and station plot; setting, hauling, and soaking time; construction of gear. Subsurface temperatures and salinities, transparency, water color at stations. Yellowfin, bigeye, skipjack, albacore catch rates; depth of capture; catch rates plotted against latitude; stomach contents (non-quantitative); sex and maturity; body temperature (compared with water temperature); length, weight, length-weight relation, age according to Aikawa's tables, condition factor; correlation of yellowfin catch with water temperature, salinity, currents, and weather examined; shark damage rates.

- 1940b. Investigation of tuna longline fishing grounds in the South China Sea. In Report of fishing ground investigations by the Shōnan Maru in 1937. Taiwan sōtokufu suisan shikenjō shuppan 21:67-117. [J,P]

Results of exploratory longlining at 16°-22°N., 116°-121°E. in Feb.-May. Fishing log with operational data, track chart and station plot; gear construction. Subsurface temperatures and salinity, transparency, water color at stations. Yellowfin, albacore: catch rates; depth of capture; stomach contents (non-quantitative); body temperature, compared with water temperature; length, weight, age according to Aikawa's tables, condition factor, sex and maturity; correlation of dark or "green" flesh color with kind of feed, condition factor, and sexual maturity attempted.

KASHIWADA, KENICHI, DAICHI KAKIMOTO,
and YOSHISHIGE HORIGUCHI.

1952. Biochemical studies on skipjack (*Katsuwonus vagans*). I. Chemical components of pyloric caeca and extractive matter. Bull. Jap. Soc. sci. Fish. 18(4):147-150. [Je,P]

Fat, moisture, ash, protein content; changes in nitrogen compounds by autolysis.

KASHIWADA, KENICHI, DAIICHI KAKIMOTO,
and TOSHIMORI YAMASAKI.

1953. Biochemical studies on skipjack. III. On the nitrogen compounds in skipjack pyloric caeca extract. Bull. Jap. Soc. sci. Fish 19(1): 15-18. [J,P]
Chemical analysis.

KATŌ, GENJI.

1940. An account of longline fishing for tuna. Nanyō suisan jōhō 4(7): 8-10. [J,P]
General account of a longlining trip in Palau waters: brief notes on yellowfin sex ratio and maturity, on soaking time and bait loss, and on working efficiency of the fishermen.

KAWAMURA, HYŌZŌ.

1939. Observations on oceanography and fishing conditions in Palau waters. Nanyō suisan jōhō 3(1):2-6. [J,P]
General discussion of yellowfin and skipjack fishing in relation to ocean currents in the Palau area.

KAWANA, TAKESHI.

1934. On the relation between the tuna fishery and oceanographic conditions. Hokkaidō suisan shikenjō suisan chōsa hōkoku 31:80 p. (Spec. sci. Rep.: Fish. U. S. Fish. Wildl. 78). [P]

Thunnus orientalis, northern Japan: catch statistics; fishing conditions related to temperature, currents, abundance of other fishes, sunspots, lunar period, wind direction; monthly average size of fish in commercial landings; tag recovery records for 6 fish.

1935. The tuna spawns in the Japan Sea. Suisan kenkyū shi 30:284-286.

Black tuna: spawning.

1937. The catch of tunny, *Thunnus orientalis* T. and S., off Kushiro, Hokkaido, in relation to the vertical difference in water temperature. Bull. Jap. Soc. sci. Fish. 6(2):73-74. (Pacific Oceanic Fishery Investigations Translation No. 50. In: Spec. sci. Rep.: U. S. Fish Wildl. 52. [P]

Temperature difference between surface and 50 m., and average numbers of large, medium, and small fish taken per trip in 13 years; Pacific Ocean-northwest.

1938. On tuna fishing conditions at Urakawa. Hoku sui shi sui chō hō 43:125-134. [J]

Thunnus orientalis: fishing conditions, Pacific Ocean - northwest.

KAWASAKI, TSUYOSHI.

1952. On the populations of the skipjack, *Katsuwonus pelamis* (Linnaeus), migrating to the Northeastern Sea Area along the Pacific

KAWASAKI, TSUYOSHI.—Continued

coast of Japan. Bull. Tōhoku reg. Fish. Res. Lab. 1:1-14. [Je,P]

Populations distinguished by size composition, condition factor, and biting qualities; distribution correlated with oceanographic conditions; length-weight relation; age determination (according to Aikawa's tables); Pacific Ocean-northwest.

KIDA, TAKEO.

1936. On the surface temperature of water in the tunny fishing grounds off Kushiro and Urakawa in summer. Bull. Jap. Soc. sci. Fish. 5(2):87-90. [Je,P]

Thynnus thynnus: fishing condition correlated with water temperature; size composition of schools; relation to other fishes, birds, plankton; Pacific Ocean-northwest.

KIKAWA, SHŌJI.

1953. Observations on the spawning of the big-eyed tuna (*Parathunnus mebachi* Kishinouye) near the southern Marshall Islands. Contrib. Nankai reg. Fish. Res. Lab. 1, Contrib. 24:10 p. [Je,P]

Mature and ripe fish abundant in longline catch in southern Marshalls, June-August; occurrence of ripe fish in relation to area, oceanographic conditions, month, and size composition; ripe eggs described and figured; successful artificial fertilization described and embryo figured.

KIMURA, KINOSUKE.

1932. Growth curves of blue-fin tuna and yellowfin tuna based on catches near Sigedera, on the west coast of Prov. Izu. Bull. Jap. Soc. sci. Fish. 1(1):1-4. (Pacific Oceanic Fishery Investigations Translation No. 37. In: Spec. sci. Rep.: Fish. U. S. Fish Wildl. 22). [P]

Neothunnus macropterus, *Thunnus orientalis*: growth rates determined from size groups; Pacific Ocean-northwest.

1933. Statistical analysis of the catch of young bluefin tuna and yellowtail in Suruga Bay. Bull. Jap. Soc. sci. Fish. 2(4):183-194. [Je,P]

Thunnus orientalis: trap catches correlated with area and with season; Pacific Ocean-northwest.

1935. Statistical analysis of the catch by keddle nets, along the coast of Suruga Bay. Rec. oceanogr. Wks. Jap. 7(1):1-36.

Neothunnus macropterus, *Thunnus orientalis*: Pacific Ocean-northwest; seasonal distribution of trap catches, 1927-32; weight frequencies; age-growth curves.

1941. Skipjack fishing conditions. Suisan seizō kōgaku kōza 1:36 p. [J]

Northwest Pacific Ocean: distribution, mi-

KIMURA, KINOSUKE.—Continued

gration, catch correlated with water temperature; age and size composition of commercial catches.

- 1942a. Tuna and spearfish fishing conditions. *Suisan seizō kōgaku kōza* 5:122 p. [J,P]
Albacore, yellowfin, bigeye tuna; north-west Pacific, Indonesian waters; landings from various longlining grounds (1936-40), fishing seasons, catch per day fished, relation of water temperature to fishing conditions; age (from Aikawa's tables) and rough size composition of albacore and yellowfin catches.

- 1942b. High seas fisheries. *Kaiyō no kagaku* 2(3): 142-7. [J,P]

Albacore, black tuna, skipjack, bigeye, yellowfin; popular account of livebait fishing and longlining grounds and seasons, relation to water temperature; proportion of skipjack landings from various areas, 1937-39.

1949. Atlas of skipjack fishing grounds—with data on the albacore grounds. Tokyo. Kuroshio Publ. Co., 44 p. [J,P]

Japan: catches of albacore and skipjack in relation to surface water temperature; chart of fishing situation and isotherms for each 10-day period of the year.

KIMURA, KINOSUKE, and KAZUMI ISHII.

1931. Fishing conditions in the northeastern part of Suruga Bay (Part 1). Tunas and spearfishes and their young. *Suisan butsuri danwakai kaihō* 33:526-538. [J]

Pacific Ocean - northwest: tuna, young.

1932. Fishing conditions in the northeastern part of Suruga Bay (Part 2), with the growth rates of black tuna and yellowfin based on catches from the Shigedera fishing grounds. *Suisan butsuri danwakai kaihō* 38:562-580. [J]

Thunnus orientalis and *Neothunnus macropterus*: growth, fishing conditions; Pacific Ocean-northwest.

- 1933a. Statistical analysis of the catch at the northeastern end of Suruga Bay. I. Bluefin tuna (*Thunnus orientalis* T. and S.). *Bull. Jap. Soc. sci. Fish.* 1(5):221-229. [Je,P]

Size composition, fishing conditions correlated with season; Pacific Ocean-northwest; annual and seasonal variations in catch and sizes of fish in Japanese tuna traps.

- 1933b. Statistical analysis of the catch at the northeastern end of Suruga Bay. II. Yellowfin tuna, swordfish, yellowtail, etc. *Bull. Jap. Soc. sci. Fish.* 2(2):69-79. [Je,P]

KIMURA, KINOSUKE, and KAZUMI ISHII.—Continued

Seasonal distribution of trap catches; correlation with water temperature; Pacific Ocean-northwest.

KIMURA, KINOSUKE, MITSUO IWASHITA, and TOSHIRO HATTORI.

1952. Image of skipjack and tuna recorded on echo sounding machine. *Bull. Tōhoku reg. Fish. Res. Lab.* 1:15-19. [Je,P]

Depth recorder traces of skipjack, albacore, and bigeye schools; notes on vertical distribution and schooling habits.

KODAMA, MASAHARU, K. IZUKA, and T. HARADA.

1934. Weight ratio of various body parts and analyses of the normal constituents of fresh flesh of important South Sea fish. *Taiwan sōtokufu suisan shikenjō jigyo hōkoku* (1932), Technol. Sect. 1-6. [J,P]

Skipjack and tuna examined.

KOYASU, SHŌZŌ.

1931. On the skipjack fishing conditions off eastern Honshū. *Suisankai* 579:2-25; 580-24-30. [J]
Katsuwonus pelamis: fishing conditions, Pacific Ocean-northwest.

KREUTZER, CONRADIN.

- 1951a. Ein elektrisches Thunfischangelgerät. *Arch. Fischereiwiss.* 3(1/2).

Fishing methods and gear; North Sea.

- 1951b. Thune werden elektrisch geangelt. *Fischereiwelt* 3(10):160-1. [P]

Description and figure of electrified hook, line, and accessories for stunning tuna.

KUMAMOTO PREFECTURE FISHERIES EXPERIMENT STATION.

1946. Experimental pole and line fishing for skipjack. *Kumamoto-ken suisan shikenjō jigyo hōkoku* (1942, 1943, 1944):3-5. [J,P]

Summary results of 4 cruises off southern Japan in July-Nov. Surface water temperatures discussed.

KUMATA, TŌSHIRO, ET AL.

1941. Illustrated atlas of edible marine animals and plants of the South Seas. *Nissan Fish. Res. Sta.*, p. 62, 65. [J]

Katsuwonus vagans, *Neothunnus macropterus*, *Parathunnus mebachi*: distribution; English and Japanese common names, figures, Dutch and Malay common names of *N. macropterus*, and *P. mebachi*.

KURONUMA, KATSUZŌ.

1940. A young of ocean sunfish, *Mola mola*, taken from the stomach of *Germo germo*, and a specimen of *Masturus lanceolatus* as the second record from Japanese waters. *Bull. biogeogr. Soc. Japan* 10(2):25-28. [JE]

Stomach contents of *Germo germo* noted.

- KURONUMA, KATSUZŌ, TAKEICHIRO KAFUKU,
and SHŌJI KIKAWA.
1949. Report of investigations of skipjack and tuna resources in 1947 by the Nakamura research staff. Cent. Fish. Exp. Sta. Rep. 1:7 p. (Pacific Oceanic Fishery Investigations Translation No. 33. In: Spec. sci. Rep.: Fish. U. S. Fish Wildl. 17). [P]
Katsuwonus pelamis, central and south Japan; morphometric data, meristic counts; size composition and sex ratio of commercial catch; sexual maturity, gonad weights, egg counts; stomach contents; catch statistics; fishing grounds and seasons.
- LE DANOIS, E.
1933. Les transgressions océaniques. Bull. Inst. océanogr. Monaco 613:1-16.
Germo alalunga, *Thunnus thynnus*: occurrence in relation to water temperature and salinity; Atlantic Ocean.
1938. L'influence des transgressions sur la biologie et la pêche. In: L'Atlantique (Histoire et Vie d'un Océan), p. 246-286. Paris, Albin Michel.
Germo alalunga: races, migrations.
1951. Sur la présence du thon blanc ou germon sur les côtes du Venezuela et sur le lieu de ponte de cette espèce dans l'Atlantique Nord. C. R. Acad. Sci. Paris 232:1029-1030.
Thunnus (Germo) alalunga; Atlantic Ocean, Caribbean Sea: spawning, migration; Sargasso Sea as probable spawning ground.
- LE GALL, J.
1934a. *Auris thazard*. In: Faune Ichthyologique de l'Atlantique Nord, No. 15. [P]
Plate including description, synonymy, distribution.
1934b. *Euthynnus alletteratus*. In: Faune Ichthyologique de l'Atlantique Nord, No. 15. [P]
Plate including description, distribution, synonymy.
1934c. *Germo alalunga*. In: Faune Ichthyologique de l'Atlantique Nord, No. 15. [P]
Plate including description, distribution, synonymy.
1934d. *Katsuwonus pelamis*. In: Faune Ichthyologique de l'Atlantique Nord, No. 15. [P]
Plate including description, distribution, synonymy.
1949. Germon. Résumé des connaissances acquises sur la biologie du germon. Rev. Trav. Off. Pêches marit. 15:1-42. [P]
Germo alalunga: synonymy, common and scientific names; systematics, figure, measurement data; digestive, respiratory,
- LE GALL, J.—Continued
and circulatory apparatus; reproduction, distribution (geographical and vertical), food, parasites, age and growth, migration, larvae; bibliography.
1951. Ichthyométrie des Thonidés. De l'emploi d'une technique internationale. J. Cons. int. Explor. Mer 17(3):267-273. [P]
Attempt to standardize techniques in taking morphometric measurements.
- LEGENDRE, R.
1932. La nourriture du germon (*Germo alalunga* Bonnaterre). Arch. Zool. exp. gén. 74:531-540. [P]
Stomach contents of *Germo alalunga*.
1933. Présence d'*Anotopterus pharao* Zugmayer dans l'estomac des germons. C. R. Acad. Sci., Paris 197:1261-1752.
Germo alalunga, Atlantic Ocean: food.
1934. La faune pélagique de l'Atlantique au large du Golfe de Gascogne recueillie dans des estomacs de germons. Première Partie: Poissons. Ann. Inst. Océanogr. 14:249-418.
Germo alalunga, Atlantic Ocean: food, biometrics, bibliography.
1936. La pêche du germon, son intérêt scientifique. Rev. Sci. 74(9):266-273.
Biology of *Germo*, methods of capture.
1937. Présence de *Parathunnus obesus* dans le Golfe de Gascogne. C. R. Soc. Biogéographie 13:66-67.
P. atlanticus: distribution; Atlantic Ocean.
1940. La faune pélagique de l'Atlantique au large du Golfe de Gascogne recueillie dans des estomacs de germons. Troisième Partie: Invertébrés (Céphalopodes exclus.). Parasites du germon. Ann. Inst. Océanogr. 20:127-310.
Germo alalunga, Atlantic Ocean: food; parasites.
- LETACONNOUX, R.
1950. Le germon (*Germo alalunga* Gmelin). Examen du nombre de branchiospines. Ann. biol., Copenhague 7:63. [P]
Meristic counts.
- LOZANO, FERNANDO.
1950. Notas sobre el bonito del norte o albacora (*Germo alalunga* Gmelin) de Galicia. Bol. Inst. esp. Oceanogr. 36:1-13. [P]
Morphometrics, notes on sexual maturity, food, age, fishing season and catch, relation of albacore and sardine fisheries.
- LÜLING, KARL H.
1950. Thunfischanlandungen am Hamburger Fischmarkt in der Schleppnetz- Heringssaison 1949. Fischerwelt 2(4):57-9. [P]

LÜLING, KARL H.—Continued

Seasonal changes in frequency distribution of fish weights in German bluefin landings.

1951. Die Thunfischanlandungen in der Schleppnetz-Heringssaison 1949 und 1950. *Fischereiwelt* 3(6):90-2. [P]

Weight of landings and frequency distribution of fish weights in North Sea bluefin catch.

- 1952a. Thunfischbeobachtungen und Thunfischfang. *Fischereiwelt* 4(2):10-2. [P]

Thunnus thynnus: habits; fishing methods and gear; echo sounder record of tuna figured.

- 1952b. Die Thunfischanlandungen in der Schleppnetz-Heringssaison 1951. *Fischereiwelt* 4(3):42-3. [P]

Seasonal changes in weight of landings and frequency distribution of fish weights in North Sea bluefin fishery.

MCHUGH, JOHN L.

1952. The food of albacore (*Germo alalunga*) off California and Baja California. *Bull. Scripps Instn. Oceanogr. tech.* 6(4):161-172. Also Contributions from the Scripps Institution of Oceanography, New Series, No. 562. [P]

Quantitative analysis of contents of 321 stomachs collected from northern California: variations in composition with latitude, year, season; compared with reports from other areas; indications of vertical distribution.

MCKERNAN, DONALD L.

1953. Pioneer longlining for tuna along the equator. *Pacif. Fisherm.* 51(8):19, 21, 23. [P]

Results of semi-commercial fishing by a West Coast vessel at 33 stations between 140° and 153°W. Yellowfin catch rates, size of fish, cannery rejection rates.

MALDURA, CARLO M.

1946. Gli olii di tonno. Natura, lavorazione, applicazioni nell' industria e in terapia. *Boll. Pesca Piscic. Idrobiol.* 1 (n. s.) Fasc. 2:105-130. [P]

Thynnus thynnus L., *Thynnus alalunga* L., *Thynnus thunnina* Cuv. and Val., *Thynnus pelamys* L., *Pelamys unicolor* Geoff.: Mediterranean; distribution, synonymy; Italian and foreign names; chemical analysis of oils.

MANTER, HAROLD W.

1940. Digenetic trematodes of fishes from the Galapagos Islands and the neighbouring Pacific. *A. Hancock Pacif Exped.* 2(14):443.

Gymnosarda alletterata and *G. pelamis* listed as hosts.

MARR, JOHN C.

1948. Observations on the spawning of oceanic skipjack (*Katsuwonus pelamis*) and yellowfin tuna (*Neothunnus macropterus*) in the northern Marshall Islands. *Fish. Bull., U. S. Fish Wildl.* 51(44):201-206. [P]

K. pelamis: records and descriptions of juveniles, ova measurements. *K. pelamis*, *N. macropterus*: spawning, length, sex, maturity.

MARR, JOHN C., and M. B. SCHAEFER.

1949. Definitions of body dimensions used in describing tunas. *Fish. Bull., U. S. Fish Wildl.* 51(47):241-244. [P]

Tunas: measuring methods, meristic counts; determination of sex and degree of maturity.

MARTÍN, CLARO.

1938. Tuna fishing and longline fishing in Davao Gulf, Philippines. *Philipp. J. Sci.* 67(2):189. *Katsuwonus pelamis*, *Neothunnus itosibi*, *Neothunnus macropterus*: listed in commercial catch.

MARUKAWA, HISATOSHI.

- 1939a. Bait fishes for tuna and skipjack. Part 4 of Fisheries of the South Sea Islands. *Nanyō suisan* 5(5):4-10. [J,P]

Scientific and common names of baitfish species of Micronesia; description; habitat; methods of capture; value as bait.

- 1939b. Fisheries of the South Sea Islands: natural food of skipjack and tunas. *Nanyō suisan* 5(7):12-14. [J,P]

Yellowfin tuna, stomach contents: juveniles of *Auxis thazard*, *Katsuwonus pelamis*, and *Parathunnus sibi* mentioned as food of tunas.

- 1939c. Tunas and the tuna fishery. Parts 1, 2, and 3. Appendix to Fisheries of the South Sea Islands. *Nanyō suisan* 53:14-22; 54:16-30; 55:34-42. [J,P]

Germo alalunga, *Neothunnus albacora*, *Parathunnus obesus*, *Thunnus thynnus*: general discussion of European tuna fisheries as compared with Japanese and American; distribution, description, spawning, feeding habits, migrations, catch statistics, fishing gear and methods. (Translation of a German article by Hans Thiele in *Die Fischeboote*; no date given, but see Thiel, 1938).

MATHER, FRANK J., III, and C. G. DAY.

1954. Observations of pelagic fishes of the tropical Atlantic. *Copeia* 1954(3):179-188. [P]

Records of capture by trolling of a few *Katsuwonus pelamis*, *Euthynnus alletteratus*, *Neothunnus albacores*, *Parathunnus*

- MATHER, FRANK J. III, and C. G. DAY.—Continued
atlanticus, *Thunnus thynnus*: distribution, length measurements.
- MATSUBARA, KIYOMATSU.
 1943. Southern fishes. Part 2. Taiwan suisan zasshi 334:11-14. [J,P]
 Brief general description of tuna longline and skipjack livebait fisheries, with remarks on location of fishing grounds in relation to oceanographic conditions.
- MATSUI, KIZŌ.
 1942a. Growth, water and fat content of the brain of skipjack and tuna. Kagaku nanyō 5(1):106-116. [J,P]
 Skipjack, yellowfin tuna from Palau waters: maturity of gonads, weight of brain in relation to body length; brain anatomy, regressions of weights of parts of brain on total brain weight; comparison with other fishes and rat.
 1942b. On the gonads of skipjack from the adjacent waters of Palau. Kagaku nanyō 5(1):117-122. (Pacific Oceanic Fishery Investigations Translation No. 19. In: Spec. sci. Rep.: Fish. U. S. Fish Wildl. 20). [P]
 Gonad weight used as a criterion of sexual maturity; gonads figured.
- MATSUI, Y.
 1938. La pesca del atún en la Baja California. Bol. Dep. for. Mex. 3:101-106.
 Tuna, Pacific Ocean - northeast; purse-seining, livebait fishing.
- MATSUMOTO, TAKESHI.
 1937. An investigation of the skipjack fishery in the waters of Woleai Island. Nanyō suisan jōhō 3:2-4. (Pacific Oceanic Fishery Investigations Translation No. 42. In: Spec. sci. Rep.: Fish. U. S. Fish Wildl. 46). [P]
 Results of experimental livebait fishing for skipjack at Woleai, Caroline Is.; observations on the scarcity of bait fish at Lamotrek and Puluwat; some oceanographic data; release of tagged skipjack recorded.
- MATSUMOTO, WALTER M.
 1952. Experimental surface gill net fishing for skipjack (*Katsuwonus pelamis*) in Hawaiian waters. Spec. sci. Rep. Fish. U. S. Fish Wildl. 90:20 p. [P]
 Description of gear, history of gill netting for tuna, fishing operations, fishing grounds and seasons.
- MAZZARELLI, G.
 1935. Programmi vecchi e nuovi per lo studio del tonno (*Thunnus thynnus* L.). Mem. Biol. mar. 3. Appendix:1-9.
T. thynnus, Mediterranean Sea.
- MEAD, GILES W.
 1951. Postlarval *Neothunnus macropterus*, *Auxis thazard*, and *Euthynnus lineatus* from the Pacific coast of Central America. Fish. Bull., U. S. Fish Wildl. 52(63):121-127. [P]
 Observations on spawning season; key.
- MEYER, P. F.
 1951. Erfahrungen mit der elektrischen Thunfischangel. Fischereiwelt 3(11):176.
 Method of using an electrified tuna hook and its effect in stunning tuna.
- MIE PREFECTURE FISHERIES EXPERIMENT STATION.
 1930a. Investigation of skipjack fishing grounds and guidance in fishing. Mie-ken suisan shikenjō jigyō hōkoku (1927):1-15. [J,P]
 Fishing logs; skipjack, bigeye, albacore catches recorded with surface water temperature and specific gravity, Japanese waters.
 1930b. Skipjack fishing and oceanographic conditions. Mie-ken suisan shikenjō hōkoku (1927):15-17. [J,P]
 Skipjack fishing conditions discussed in relation to water temperature and specific gravity; Japanese waters, May-August; plots of two 100-mile oceanographic sections.
 1930c. Investigation of tuna fishing grounds and guidance in fishing. Mie-ken suisan shikenjō jigyō hōkoku (1927):18-33. [J,P]
 Longline fishing logs and station plots, Japanese waters; albacore, bigeye, black tuna, yellowfin catches recorded with surface water temperature and specific gravity; plots of two 100-mile oceanographic sections; fishing discussed in relation to oceanographic conditions.
 1930d. Investigation of skipjack fishing grounds and guidance in fishing. Mie-ken suisan shikenjō jigyō hōkoku (1928):1-18. [J,P]
 Livebait fishing logs and station plots, Japanese waters; skipjack, albacore, bigeye, yellowfin catches recorded with surface water temperature and specific gravity; plots of two 100-mile oceanographic sections; fishing discussed in relation to oceanographic conditions.
 1930e. Investigation of tuna fishing grounds and guidance in fishing. Mie-ken suisan shikenjō jigyō hōkoku (1928):19-33. [J,P]
 Longline fishing logs and station plots, Japanese waters; albacore, bigeye, black tuna, yellowfin catches recorded with surface water temperature and specific gravity; plots of two 100-mile oceanographic

MIE PREFECTURE FISHERIES EXPERIMENT STATION.—

Continued

sections; fishing discussed in relation to oceanographic conditions.

- 1950a. No. 1 Taiyō Maru's 2nd exploratory tuna fishing cruise in 1950. Mie sui shi jihō 165:8-12. [J]

Fishing conditions; Pacific Ocean - north-west.

- 1950b. Shinro Maru's investigation of the coastal tuna longline fishery. Mie sui shi jihō 165:15-16. [J]

Fishing conditions; Pacific Ocean—north-west.

- 1950c. Outline of the skipjack fishery in 1950. Mie sui shi jihō 165:24-25. [J]

Fishing conditions; Pacific Ocean—north-west.

MIGITA, M., and K. ARAKAWA.

1948. Melanophorhormone of fishes. Contrib. cent. Fish. Sta. Japan (1946-48) 39:241-244. [Je] Frigate mackerel, skipjack, *Thunnus orientalis*, yellowfin tuna: melanophorhormone content of pituitary glands tabulated; proportional weight of various parts of *T. orientalis* brain; brain of yellowfin figured.

MILIĆ, N.

1937. Tunolov. Ribarski kalendar: 53-57. Fishing methods and gear, Adriatic Sea.

MINE, TATSUZŌ, and SATORU IEHISA.

1940. Homogeneity of the groups of black tuna in the Satsunan Sea area. Bull. Jap. Soc. sci. Fish. 8(6):292-294. (Pacific Oceanic Fishery Investigations Translation No. 53. In: Spec. sci. Rep: Fish. U. S. Fish Wildl. 52). [P] Size composition of commercial longline catch, seasonal changes; age composition (by Alkawa's tables); seasonal changes in catch per trip; southern Japan.

MIURA, T.

1941. Fishes of South Seas. Tokyo, Unebi Book Co., Ltd. 416 p. [J] Narrative of trip through various fishing grounds (skipjack, etc.), includes: (1) In search of skipjack, p. 3-32; (2) South Sea skipjack, p. 35-66; (3) Bait for South Sea skipjack, p. 67-72; (4) South Sea *Neothunnus macropterus*, p. 73-87.

MIYAMA, YOSHIMICHI, and I. OSAKABE.

1938. On the character of the fats obtained from the various bodily parts of fishes. Bull. Jap. Soc. sci. Fish. 7(2):105-106. [Je,P] *Katsuwonus vagans*, *Parathunnus sibi*, *Thunnus orientalis*: chemical analysis of fats.

MIYAMA, YOSHIMICHI, and I. OSAKABE.—Continued

1940. Note on the vitamin oil contained in the liver of fishes. Bull. Jap. Soc. sci. Fish. 9(1):16-20. [Je,P]

Bigeye, black tuna, skipjack, yellowfin: chemical analysis of liver and liver oil.

MIYAMA, YOSHIMICHI, K. SARUYA, and T. HASEGAWA.

1939. On the characters of the fats obtained from various body parts of fish. Bull. Jap. Soc. sci. Fish. 8(4):185-186. [Je,P]

Thunnus macropterus: South Seas; chemical analysis of various body parts; length-weight data, sex, and stomach contents of specimens recorded.

MIYAZAKI PREFECTURE HIGH-SEAS FISHERY GUIDANCE CENTER.

1953. Tuna longline fishery guidance. Miyazaki-ken enyō gyōgō shidōsho gyōmu gaiyō: 3-41. [J,P]

Reports of 7 longlining cruises to South China Sea, Philippine, and New Guinea waters; complete fishing logs and operational information; catch rates, size composition, sex ratios and maturity for yellowfin and bigeye; water temperature at surface, 50 m., and 100 m.

MIZUSHIMA, KŌICHIRO, et al.

1951. Studies on green meat in albacore. In: Itsumi shō tōsen rombun: 1-81. Publ. by Shizuoka kanzume kyōkai gijutsubu. [J,P]

Green discoloration of albacore flesh studied from physiological, histological, chemical, and technological points of view to determine its cause.

MOLTENO, C. J.

1948. The South African tunas. Cape Town, South African Fishing Industry Research Institute, 34 p. [P]

Economics of the tuna fishing industry; how to recognize a tuna; commercial tuna fishing methods; synonymy, description, distribution, utilization of *Thunnus thynnus* L., *Germo albacora* (Lowe), *Sarda sarda* (Bloch), *Euthynnus pelamis* L., *Euthynnus alletteratus* (Rafinesque), *Germo alalunga* (Bonnaterre), *Auwis thazard* (Lacépède), *Germo obesus* (Lowe), *Neothunnus itosibi* (Jordan and Evermann).

MOORE, HARVEY L.

- 1951a. Estimation of age and growth of yellowfin tuna (*Neothunnus macropterus* Temminck and Schlegel) in Hawaiian waters. (Unpublished thesis submitted for the degree of Master of Science, University of Hawaii, Honolulu). [P]

Scale and vertebra reading, and weight frequency analysis.

MOORE, HARVEY L.—Continued

- 1951b. Estimation of age and growth of yellowfin tuna (*Neothunnus macropterus*) in Hawaiian waters by size frequencies. *Fish. Bull.*, U. S. Fish Wildl. 52(65):133-149. [P]
Scale and vertebra reading, and weight frequency analysis.

MORICE, JEAN

- 1953a. Essai systématique sur les familles des Cybiidae, Thunnidae, et Katsuwonidae, poissons scombroïdes. *Rev. Trav. Inst. sci. tech. Pêches marit.* 18(1):35-63. [P]

Discussion of anatomy and systematics of the genera *Acanthocybium*, *Cybiium*, *Grammatorcynus*, *Sarda*, *Orcynopsis*, *Gymnosarda*, *Thunnus*, *Germo*, *Parathynnus*, *Neothunnus*, *Katsuwonus*, *Euthynnus*, and *Ausis*; keys to the genera; brief bibliographies; figures of *A. solandri*, *C. maculatum*, *C. regale*, *C. cavalla*, *S. sarda*, *S. orientalis*, *G. alalonga*, *K. pelamis*, *E. alletteratus*, and *A. thazard*.

- 1953b. Un caractère systématique pouvant servir à séparer les espèces de Thunnidae atlantiques. *Rev. Trav. Inst. sci. tech. Pêches marit.* 18(1):65-74. [P]

Descriptions and figures of livers of *T. thynnus*, *G. alalonga*, *P. obesus*, *Neothunnus albacora*, and *S. sarda*; liver morphology as a systematic character.

MOROVIĆ, DINKO.

1950. Prilog bibliografiji jadranskog ribarstva. Split, Jugoslavia, Institut Oceanografiju i Ribarstvo u Splitu, 142 p. [P]

Bibliography of material on Adriatic (and other) fisheries published in the Croatian language from 1869 to 1949.

MORROW, JAMES E.

1954. Data on dolphin, yellowfin tuna, and little tuna from East Africa. *Copeia* 1954 (1):14-16.

Morphometric measurements and sex of 11 *Euthynnus affinis* and 29 *Thunnus albacora* from the Mombasa area.

MOWBRAY, LOUIS L.

1935. Description of the Bermuda large-eyed tuna, *Parathunnus ambiguus*, n. sp. Government Aquarium, Bermuda. (Three-page, unnumbered, privately printed pamphlet.)

MURAYAMA, BINZŌ, and SHIRŌ OKURA.

1950. A study of experimental American-style purse seining (III). *J. Fish. Res. Inst.* 3:233-257. [J,P]

Catches of purse seiners fishing skipjack and black tuna off the Japanese coast; construction details of a 50-ton purse seiner.

MURAYAMA, BINZŌ, and SHIRŌ OKURA.—Continued

1952. A study of experimental American-style purse seining (IV). *J. Fish. Res. Inst.* 4:381-394. [J,P]

Catches and details of operations of purse seiners fishing for skipjack and black tuna off the Japanese coast; details of seine construction.

MURPHY, GARTH, I., and E. L. NISKA.

1953. Experimental tuna purse seining in the central Pacific. *Comm. Fish. Rev. U. S. Fish Wildl.* 15(4):1-12. [P]

Description of gear, results of purse seining in vicinity of Phoenix, Line and Hawaiian islands; factors affecting success: weather, clarity of water, vertical thermal structure, behavior of surface schools of skipjack and yellowfin; use of livebait in skipjack purse seining.

MURPHY, GARTH I., and RICHARD S. SHOMURA.

1952. New tuna source: Fish and Wildlife Service's investigation reveals potential new grounds. *Pan-Amer. Fish.* 6(10):14-16. [P]

Results of experimental longlining in equatorial waters between 150° and 165° W. Yellowfin, bigeye, albacore, skipjack catches, total catch rates, geographical distribution; relation of upwelling to tuna abundance; possibility of commercial exploitation.

- 1953a. Longline fishing for deep-swimming tunas in the central Pacific, 1950-51. *Spec. sci. Rep. Fish. U. S. Fish Wildl.* 98:47 p. [P]

Description of longline fishing; horizontal and vertical distribution of deep-swimming tunas in equatorial waters; sex ratios and size composition of yellowfin, bigeye, albacore, skipjack; relation of upwelling to zooplankton and tuna abundance; commercial possibilities.

- 1953b. Longline fishing for deep-swimming tunas in the central Pacific, January-June 1951. *Spec. sci. Rep. Fish. U. S. Fish Wildl.* 108:32 p. [P]

Results of experimental longlining in equatorial waters from 120°W. to 180°. Vertical and horizontal distribution of yellowfin, bigeye, albacore, skipjack; size compositions and sex ratios. Operational data and comparison of gear with shallow and deep float lines. Effect of wind on upwelling and tuna abundance.

MURRAY, J. J.

1952. Report on 1951 exploratory blue-fin tuna fishing in the Gulf of Maine. *Comm. Fish. Rev.* 14(3):1-19. [P]

Results of experimental purse seining; description of equipment and methods; log of operations.

NAKAMURA, HIROSHI.

1935. Über intersexualität bei *Katsuwonus pelamis* (Linn.) Trans. Nat. Hist. Soc. Formosa 25 (141):197-198. [J]
Example of hermaphroditism recorded and described.
1936. On the food habits of yellowfin tuna, *Neothunnus macropterus* (Schlegel), from the Celebes Sea. Trans. Nat. Hist. Soc. Formosa 26(148):1-8. (Pacific Oceanic Fishery Investigations Translation No. 17. In: Spec. sci. Rept: Fish. U. S. Fish Wildl. 23). [P]
Analyses of stomach contents of 57 longline-caught fish; length-weight data.
1938. Preliminary report on the habits of the black tuna, *Thunnus orientalis* (Schlegel). Zool. Mag. 50(5):279-281. [J,P]
Description and figure of mature egg; gonads figured, distribution, sexual maturity, spawning areas and seasons.
- 1939a. Summary of an investigation of scombroids of Formosan waters. Taiwan suisan zasshi 288:22-26. [J,P]
N. macropterus, *T. orientalis*, *P. mebachi*, *T. germo*, *K. pelamis*, *Euthynnus yaito*, *Kishinoella rara*, *Gymnosarda nuda*, *Auxis hira*, *A. maru*: listed as occurring in Formosan waters; Japanese common names.
- 1939b. Report on the investigation of Thunnidae in Formosan waters. Taiwan sōtokufu suisan shikenjō shuppan 13:1-15. [Je,P]
Auxis hira, *A. maru*, *Euthynnus yaito*: classification; Japanese common names; synonymy. *Katsuwonus pelamis*, *Kishinoella rara*, *N. macropterus*, *Parathunnus mebachi*, *Thunnus germo*, *T. orientalis*: classification; description; distribution; synonymy; Japanese common names; figures of all except *N. macropterus*, *P. mebachi*, and *T. germo*. *N. macropterus*: spawning, morphometric data; compared externally with *N. itosibi* and *Semathunnus guildi*. *K. rara* compared externally with *K. zacalles*; spawning of *T. orientalis*.
- 1939c. Notes on differences between *Neothunnus macropterus* and *Neothunnus itosibi*. Taiwan suisan zasshi 288:27-32. [J,P]
N. macropterus: classification, morphometric data, synonymy; *Neothunnus* compared with *Semathunnus*.
1941. On the body temperatures of some species of Thunnidae and Istiophoridae. Suisan gakkwai hō 8(3):256-263. [J,P]
Yellowfin tuna, bigeye tuna, Formosan and Philippine waters; body temperatures compared with water temperatures at presumed depth of capture.

NAKAMURA, HIROSHI.—Continued

1943. Tunas and spearfishes. Kaiyō no kagaku 3 (10):445-459. (Pacific Oceanic Fishery Investigations Translation No. 47). [P]
Neothunnus macropterus, *N. rarus*, *Parathunnus mebachi*, *Thunnus germo*, *T. orientalis*: classification, distribution, food, Japanese common names, spawning.
1949. The tunas and their fisheries. Tokyo, Takeuchi Shobō. 118 p. (Translated as Spec. sci. Rep: Fish. U. S. Fish Wildl. 82.) [P]
Thunnus orientalis, *Germo germo*, *Parathunnus mebachi*, *Neothunnus macropterus*, *N. rarus*: anatomy, description, figures, classification, keys; general account of food, spawning, growth, migration, distribution of longline catch rates in western Pacific; fisheries, relation of fishing grounds to topography and oceanography, fishing seasons; bibliography. Similar material on spearfishes.
1951. Tuna longline fishery and fishing grounds. Tokyo, Takashima Shoten pub. 144 p. (Also published as Nankai Regional Fisheries Research Laboratory Rept. No. 1. Translated as Spec. sci. Rep: Fish. U. S. Wildl. 112) [P]
Compilation of research vessel longline catch rates for approximately 20 prewar years. Geographical and seasonal distribution of *N. macropterus*, *P. sibi*, *G. germo*, *T. orientalis*, and spearfishes in the western Pacific and Indonesian waters; average catch rates for each species plotted by 1° squares. Relation of fishing grounds and seasons to meteorological and oceanographical phenomena.
- NAKAMURA, HIROSHI, TADAO KAMIMURA, and YŌICHI YABUTA.
1953. Size composition of the albacore and bigeyed tuna caught in the North Pacific area. Contrib. Nankai reg. Fish. Res. Lab. 1, Contrib. 12:6 p. [Je,P]
Length composition of longline-caught albacore and bigeye from the central North Pacific; discussion of age and growth, and of annual variations in size composition.
- NAKAYAMA, TAKUZŌ.
1948. Calculation of the cost price in the tuna fishery. Suisankai 770:10-16. (In: Spec. sci. Rep: Fish: U. S. Fish Wildl. 79). [P]
Japanese tuna longline fishery; economic statistics.
- NANKAI REGIONAL FISHERIES RESEARCH LABORATORY.
- 1951a. Report No. 1. 144 p. [J,P]
See Nakamura, Hiroshi, 1951. Contents are identical, but this Report has the text and the charts bound separately.

NANKAI REGIONAL FISHERIES RESEARCH LABORATORY.—
Continued

- 1951b. Supplementary report no. 1:194 p. [J,P]
Distribution of albacore longline catch rates in the northwest Pacific by 1° squares, 1948-51; albacore length frequencies by month and area; survey of construction and dimensions of longline gear of numerous vessels, with area of employment and catch rates by species.
- NAVARRO, FRANCISCO DE P., and F. LOZANO.
1950. Carta de pesca de la costa del Sahara, desde el Cabo Juby al Cabo Barbas. Trab. Inst. esp. Oceanogr. 21:24 p. [P]
Atún (*Thunnus thynnus* L.), patudo (*Parathunnus obesus* Lowe), rabil (*Neothunnus albacora* Lowe), bonito de altura (*Katsuwonus pelamis* L.), bonito del norte (*Germo alalunga* Gmelin), melva (*Auxis thazard* Lacep.): occurrence and fishing methods.
- NAVAZ, JOSÉ M.
1950. Contribución al estudio de los escómbridos de la costa vasca (atún, bonitos, y melva). Bol. Inst. esp. Oceanogr. 31:21 p. [P]
Morphometrics, fishing seasons, catch of *Thunnus thynnus*, *Germo alalunga*, *Katsuwonus pelamis*, and *Auxis thazard* in the Bay of Biscay; bibliography; Spanish and Basque names.
- NICHOLS, JOHN T., and F. R. LA MONTE.
1941. Yellowfin, Allison's, and related tunas. Ichth. Contr. Int. Game Fish Assn. 1(3):27-32 [P]
Neothunnus albacora, *N. allisoni*, *N. catalinae*, *N. rarus*: classification, description, English common names, key, synonymy. Provisional subspecies: *Neothunnus albacora macropterus*, *N. allisoni allisoni*, *N. allisoni itosibi*, and *N. rarus zacalles*, proposed.
- NIGRELLI, ROSS F., and H. W. STUNKARD.
1947. Studies on the genus *Hirudinella*, giant trematodes of scombriform fishes. Zoologica, N. Y., 31(4):185-196. (Contribution No. 747, Dept. of Tropical Research, N. Y. Zoological Society).
Table 4: *Hirudinella* from scombriform fishes other than *Acanthocybium*: *Parathunnus atlanticus*, *Katsuwonus pelamis*, *Euthynnus alletteratus*, *Neothunnus macropterus*, *Thunnus thynnus*. Lists name of collector, host, locality and figure.
- NISHIKAWA, SADAICHI.
1934. On the future of the high-seas skipjack and tuna fisheries and standards for their operating methods. Rakusui 29(4):20-22. [J]
Fishing methods and gear.
- NISKA, EDWIN L.
1953. Construction details of tuna long-line gear used by Pacific Oceanic Fishery Investigations. Comm. Fish. Rev. U. S. Fish Wildl. 15(6):1-6. Also Separate No. 351. [P]
Description of gear construction.
- NIWA, HITOMARO.
1937. On the pigments in the muscles of fishes. Rep. No. 1, Pigments of tuna muscle. Suisan kenkyū shi 32(6):306-313. [J]
Chemical analysis.
- NOGUCHI, SADAMI.
1938. The Ogasawara Is., and the future of our tuna fishery. Suisankai 666:44-46. [J]
Pacific Ocean - northwest.
- NOMURA, TOSHIZŌ, ET AL.
1952-3. Survey of the high-seas tuna fisheries based on landings at Misaki, Tokyo, and Yaizu. Reports of the following months' operations are in the indicated numbers of the Kanagawa suishi geppō: April and May 1952, 1:3-20; June 1952, 2:1-7; July 1952, 3:1-6; Aug. 1952, 4:1-10; Sept. 1952, 5:1-8; Oct. and Nov. 1952, 6:1-10; Dec. 1952 and Jan. 1953, 7:1-15; April 1953, 9:1-10; June 1953, 11:1-20; July 1953, 12:1-18; the reports of February and March 1953 operations were published as Maguro-rui mizuagechi chōsa (unnumbered, undated) by the Kanagawa Prefecture Fisheries Experiment Station; the report for May 1953 operations is in Report of survey for tuna fishing 1:1-22; the report for August 1953 operations is in Tuna fishing 4:17-32. [J,P]
Average catch rates for yellowfin, bigeye, albacore, bluefin, skipjack, and spearfishes reported by Japanese longline vessels from various areas of the western and central Pacific, Indonesian waters, and the Indian Ocean by months; plots of locations fished by the vessels investigated; discussion of fishing conditions in each area for the month; length frequencies of each species by area.
- ŌITA PREFECTURE FISHERIES EXPERIMENT STATION.
1930. Report of experimental tuna fishing in the Kantō region (1927). Ōita-ken suisan shiken-jō jigyō hōkoku (1927-28):1-40. [J,P]
Longline catches of yellowfin, bigeye, and black tuna off central Japan: morphometric data, body temperatures compared with water temperatures; gear construction, general account of tuna fisheries and bases of the region.
- OKADA, YAICHIRO, and KIYOMATSU MATSUBARA.
1938. Keys to fishes and fish-like animals of Japan. Tokyo, Sanseidō Co., Ltd., p. 146-150. [J]
Auxis hira, *A. tapeinosoma*, *Euthynnus alletteratus*, *E. yaito*, *Germo germo*, *Kat-*

OKADA, YAICHIRO, and KIYOMATSU MATSUBARA.—Continued

suwonus vagans, *Kishinoella rara*, *Neothunnus itosibi*, *N. macropterus*, *Parathunnus orientalis*: classification, description, key, Japanese common names.

1953. Bibliography of fishes in Japan (1612-1950). Mie Prefecture, Faculty of Fisheries, Prefectural University of Mie, 228 p. [P]

General bibliography of Japanese and foreign literature on fishes which occur in Japanese waters; arranged by years, not annotated.

OKADA, YAICHIRO, ET AL.

1935. Illustrated atlas of Japanese fishes. Tokyo, The Sansaidō Co., Ltd.

Scomber tapinocephalus, *Auxis tapinosoma*, *Sarda orientalis*, *Katsuwonus vagans*, *Euthynnus yaito*, *Thunnus orientalis*, *Germo germo*, *Parathunnus sibi*, *Neothunnus macropterus*. All figured, briefly described, brief notes on distribution, habits and utilization; spawning.

OKAJIMA, KIYOSHI.

1939. Tuna fisheries of Kanagawa and Shizuoka prefectures. Nanyō suisan jōhō 3(1):7-23. [J,P]

General description of ports of Misaki and Omaezaki; accounts of vessels, gear, fishing methods, fishing grounds, and sample catches of longline, livebait, and mother-ship-type handlining fisheries.

OKAMOTO, GOROZO.

1940. On the composition of shoals of "katsuo," *Euthynnus vagans* (Lesson), in the north-eastern Japanese waters as analyzed by the body weight. Bull. Jap. Soc. sci. Fish. 9(3):100-102. (Pacific Oceanic Fishery Investigations Translation No. 52. In: Spec. sci. Rep.: Fish. U. S. Fish Wildl. 51). [P]

Size composition of commercial catch from various grounds, seasonal changes; age (according to Aikawa's tables).

OKINAWA PREFECTURE FISHERIES EXPERIMENT STATION.

1931. Investigation of the maturity of skipjack. Okinawa-ken suisan shikenjō jigyo hōkoku (1930):106-107. [J,P]

Skipjack length-weight data; gonad weight and maturity.

1936a. Experimental skipjack fishing. Okinawa-ken suisan shikenjō jigyo hōkoku (1934):1-28. [J,P]

Results of livebait fishing in Ryūkyū waters; fishing logs of 15 trips, with operational data, catch, weather, surface temperature.

OKINAWA PREFECTURE FISHERIES EXPERIMENT STATION.—Continued

1936b. Experimental longline fishing for tuna. Okinawa-ken suisan shikenjō jigyo hōkoku (1934):29-35. [J,P]

Results of two cruises to Philippines and Hainan I. waters; construction of gear; fishing logs with catch, weather, surface temperature, operational data; yellowfin, bigeye: catch per unit of effort.

1936c. Experiment on holding livebait for skipjack. Okinawa-ken suisan shikenjō jigyo hōkoku (1934):36-46. [J,P]

Attempt to correlate captures of *gatsun* (*Trachurus* sp.) with air and water temperature, atmospheric pressure, specific gravity of water.

1940a. Experimental skipjack fishing. Okinawa-ken suisan shikenjō jigyo hōkoku (1939):3-5. [J,P]

Ryūkyū Islands: skipjack catch recorded with air and water temperature.

1940b. Experimental tuna fishing. Okinawa-ken suisan shikenjō jigyo hōkoku (1939):6-8. [J,P]

Bigeye tuna, black tuna: Bonin Islands; catches recorded with water temperature.

1943. Experimental skipjack fishing. Okinawa-ken suisan shikenjō jigyo hōkoku (1941):4-14. [J,P]

Ryūkyū Islands: distribution of skipjack; catch recorded with air and water temperatures.

OKUMA, YASUMICHI, ET AL.

1935. Investigation of South Sea fisheries by the Shōnan Maru; investigation of tuna fishing grounds. Taiwan sōtokufu suisan shikenjō jigyo hōkoku (1933):120-123. [J,P]

Yellowfin tuna: Indo-Pacific region; distribution, stomach contents, length-weight data, sexual maturity, fishing conditions in relation to oceanography and weather, catch per unit of effort.

OKUMURA, ISABURŌ.

1943. Management of the southern tuna fisheries. Suisankai 728:67-72. [J]

ŌMORI, KAGEYU, and T. FUJIMOTO.

1940. Experimental longline fishing for tuna. Nagasaki-ken suisan shikenjō jigyo hōkoku (1938):175-214. [J,P]

Bigeye tuna, black tuna: Japan; catches in relation to water temperature and specific gravity.

ŌMORI, KAGEYU, and M. FUKUDA.

1938. Experimental longline fishing for tuna. Nagasaki-ken suisan shikenjō jigyo hōkoku (1936):47-48. [J,P]

- ÖMORI, KAGEYU, and M. FUKUDA.—Continued
Bigeye tuna, black tuna: Japan; catches in relation to water temperature and specific gravity.
1940. Experimental longline fishing for tuna. Nagasaki-ken suisan shikenjō jigyo hōkoku (1937):45-92. [J,P]
Bigeye tuna, black tuna: Japan; catches in relation to water temperature and specific gravity.
- ONODERA, MATSUJI.
1941. The relation of freshness and condition factor of Palau Islands skipjack to the ratio of finished products. Nanyō suisan jōhō 5(2):7-17. [J,P]
Skipjack length-weight data, body condition of fish.
- ŌYA, TAKEO, and T. TAKAHASHI.
1936. On the growth acceleration substance in the liver of the marine animals. Bull. Jap. Soc. sci. Fish. 5(3):192-194. [Je,P]
Growth hormones in skipjack livers.
- PARTLO, J. M.
1950. A report on the 1949 albacore fishery (*Thunnus alalunga*). Circ. Pac. biol. Sta., Nanaimo 20:37 p. [P]
Thunnus alalunga: age and growth, catch in relation to water temperature, tagging, food, fishing gear.
1951. A report on the 1950 albacore fishery of British Columbia (*Thunnus alalunga*). Circ. Pac. biol. Sta., Nanaimo 23:7 p. [P]
Thunnus alalunga: distribution of catch for temperature intervals, tagging, size groups in commercial catch, offshore water temperatures, log records.
- PHILLIPPS, W. J.
1932. Notes on new fishes from New Zealand. N. Z. J. Sci. Tech. 13(4):226-234.
Description of Pacific yellow-finned albacore, *Neothunnus itosibi*, as new to N. Z.
- POISSON, R., and E. POSTEL.
1951. Sur la présence d'une vessie natatoire chez certains individus d'*Euthynnus alliteratus* (Rafn.) (poisson téléostéen). C. R. Acad. Sci. Paris 233:201-203.
Anatomy of air bladder; description.
- POSTEL, E.
1949. Les thonidés d'Afrique Occidentale Française. Bull. Serv. Elev. Industr. anim. A. O. F. 2(4):39-46.
1950. Pêche sur les côtes d'Afrique occidentale. II. Rapport et note sur quelques poissons de surface de la presqu'île de Cap-Vert. Inspection générale de l'élevage, Dakar, French West Africa. 77 p. [P]
- POSTEL, E.—Continued
Euthynnus alliteratus: morphology, anatomy, ecology; fishing methods.
- POWELL, A. W. B.
1937. Marine fishes new to New Zealand; including the description of a new species of *Halleutaea*. Trans. roy. Soc. N. Z. 67(1):80.
Neothunnus itosibi: recorded, synonymy, description, figured.
- POWELL, DONALD E.
1950. Preliminary report on 1950 North Pacific albacore tuna explorations of the *John N. Cobb*. Comm. Fish. Rev. 12(12):1-7. [P]
Results of exploratory trolling, gillnetting, and longlining, Oregon to Alaska; water temperatures related to fishing; stomach contents, tagging, plankton; size range of catch.
- POWELL, DONALD E., and H. A. HILDEBRAND.
1950. Albacore tuna exploration in Alaskan and adjacent waters, 1949. Fish. Leaflet, U. S. Fish Wildl., 376:33 p. [P]
History of West Coast fishery; abundance and location as shown by exploratory surface and deep trolling catches; water temperatures related to fishing; length composition of catch, stomach contents (non-quantitative); potential livebait sources evaluated; plankton, saury, blue shark, birds, cetaceans as indicators of tuna.
- POWELL, DONALD E., D. L. ALVERSON, and R. LIVINGSTONE, JR.
1952. North Pacific albacore tuna exploration-1950. Fish. Leaflet, U. S. Fish Wildl., 402:56 p. [P]
Trolling, gillnet, longline gear and methods; migration, tagging, vertical distribution; water temperature related to fishing; diurnal fishing trends; length composition; stomach contents; shark and other damage to catch.
- PRIOL, E. P.
1944. Observations sur les germons et les thons rouges capturés par les pêcheurs bretons. Rev. Trav. Off. Pêches marit. 13:387-439. [P]
Thynnus (Germon) alalunga Gmelin: ecology, enemies, parasites; anatomy; figures of otoliths, vertebrae, measuring technique; reproduction, food. *Thynnus (Ornycynus) thynnus* L.: color, food, measurement data.
- RASALAN, SANTOS B.
1950. New methods of fish capture in the Philippines. Bull. Fish. Soc. Philipp. 1:57-66. [P]
Diagram of tuna longline gear and estimated cost.

RAWLINGS, JOHN E.

1953. A report on the Cuban tuna fishery. Comm. Fish. Rev. 15(1):8-21. [P]

History, fishing methods and gear, bait, catch, seasons; *Parathunnus atlanticus*, *Katsuwonus pelamis*, *Neothunnus argenti-vittatus* recorded in catch.

REINTJES, JOHN W.

1952. Food and feeding habits of the yellowfin tuna, *Neothunnus macropterus*, in relation to its distribution in the central Pacific region. (Unpublished thesis submitted for the degree of Master of Science, University of Hawaii, Honolulu.) [P]

Kinds and sizes of organisms taken; gorging; diurnal variation; variation in volume of stomach contents related to locality, habitat, fish size.

REINTJES, JOHN W., and J. E. KING.

1953. Food of yellowfin tuna in the central Pacific. Fish. Bull., U. S. 54(81):91-110. [P]

Kinds and sizes of organisms taken; gorging; diurnal variation; variation in volume of stomach contents related to locality, habitat, fish size.

REISS, P., and E. VELLINGER.

1929. Mesures du pH de l'eau de mer aux environs de Tunis en vue d'une application a l'étude des migrations du thon. Bull. Sta. océanogr. Salammbo 15:1-19.

Bluefin tuna; migrations related to pH of sea water.

RIVAS, LUIS R.

1951. A preliminary review of the western North Atlantic fishes of the family Scombridae. Bull. mar. Sci. Gulf Caribb. 1(3):209-230. [P]

Key: *Auxis thazard*, *Katsuwonus pelamis*, *Euthynnus alletteratus*, *Thunnus thynnus*, *Thunnus atlanticus*, *Thunnus argenti-vittatus*, *Thunnus alalunga*, *Sarda sarda*.

1953. The pineal apparatus of tunas and related scombrid fishes as a possible light receptor controlling phototactic movements. Bull. mar. Sci. Gulf Caribb. 3(3):168-180. [P]

Thunnus thynnus, *Germo*, *Parathunnus*, *Neothunnus*, *Auxis*, *Katsuwonus*, *Euthynnus*, *Sarda*: anatomy; phototaxis.

ROBINS, J. P.

1952. Further observations on the distribution of striped tuna, *Katsuwonus pelamis* L., in eastern Australian waters, and its relation to surface temperature. Aust. J. Mar. Freshw. Res. 3(2):101-110. [P]

ROEDEL, PHIL M.

1948a. Common marine fishes of California. Fish. Bull., Sacramento. 68:59-63. [P]

Katsuwonus pelamis, *Neothunnus macropterus*, *Thunnus germo*, *T. thynnus*: clas-

ROEDEL, PHIL M.—Continued

sification, description, key, distribution, English common names; anatomical differences between *Parathunnus mebachii* and *T. germo* and between *P. mebachii* and *N. macropterus* noted.

1948b. Occurrence of the black skipjack (*Euthynnus lineatus*) off southern California. Calif. Fish Game 34(1):38-39. [P]

Distributional note.

RONQUILLO, INOCENCIO A.

1953. Food habits of tunas and dolphins based upon the examination of their stomach contents. Philipp. J. Fish. 2(1):71-83.

Neothunnus macropterus, *Katsuwonus pelamis*, *Euthynnus yaito*: stomach contents of troll-caught fish from Philippine waters identified.

ROSA, HORACIO, JR.

1950. Scientific and common names applied to tunas, mackerels, and spearfishes of the world with notes on their geographic distribution. Washington, D. C., Food and Agriculture Organization of the United Nations, 235 p. [P]

ROSEN, NILS.

1943. Tonfiskens upptradande i våra farvatten. Fauna och Flora 1943:23-26. [P]

Orcyynnus thynnus: migrations, trends in catch, seasons; North Sea and Baltic.

ROYCE, WILLIAM F.

1953. Preliminary report on a comparison of the stocks of yellowfin tuna. Proc. Indo-Pacif. Fish. Coun. 4 (Section II):130-145. [P]

Neothunnus macropterus: morphometric data; distribution; analysis, comparison, and evaluation of data for defining populations.

RUSSELL, F. S.

1933a. Tunny in the North Sea. Nature 132(3342):786.

Thunnus thynnus: distributional note.

1933b. Tunny in the North Sea. Nature 132(3344):860.

Thunnus thynnus: distributional note.

1934a. Tunny investigations made in the North Sea on Col. E. T. Peel's yacht *St. George*, summer 1933. Part 1: Biometric data. J. Mar. biol. Assoc. U. K. 19(2):503-522.

Thunnus thynnus: tuna hooks marked, measurements of tuna described.

1934b. The tunny, *Thunnus thynnus*, Linnaeus—An account of its distribution and biology. Sci. Progr. Twent. Cent. 28(112):634-649.

Chart showing distribution, where caught by hooks and where by nets; habits; descriptions of madrague or thonnaire (nets

- RUSSELL, F. S.—Continued
used in Mediterranean and on coasts of Spain, Portugal, and Africa).
1936. Submarine illumination in relation to animal life. Rapp. Cons. Explor. Mer Copenhague 101(2):1-8. [P]
Thunnus thynnus: effect of illumination on migration.
- SAITŌ, MUNEKAZU.
1937. Oceanographic investigations and tuna fishing conditions in the Solomon Islands. Suisan kenkyū shi 32(5):260-271. [J]
Oceanographic conditions in relation to fishing; Pacific Ocean-southwest.
- SAKAI, MORISABURŌ, and MICHIO UNO.
1940. Tuna (maguro) fisheries and boats in Japan. J. Imp. Fish. Exp. Sta. 10:1-37. [Je,P]
Statistical study of 80 Japanese tuna long-line boats: equipment, fishing gear, crews, finances, fishing seasons and grounds.
- SAMSON, V. J.
1940. Notes on the occurrence of albacore *Germo alalunga* in the North Pacific. Copeia 1940(4):271.
Distributional note.
- SANZO, L.
1932. Uova e primi stadi larvali di tonno (*Orcynus thynnus* Ltkn.). Mem. R. Com. Talass. Ital. 189:16 p. [P]
Spawning season in Mediterranean deduced from egg and larva collections; description and figures of mature ovarian eggs and pelagic eggs; compared with eggs of *T. germo* and *Auxis*; development, measurements, description, and figures of larvae at various stages.
1933. Uova e primi stadi larvali di alalonga (*Orcynus germo* Ltkn.). Mem. R. Com. Talass. Ital. 198:9 p.
Spawning season in the Mediterranean deduced from collections of eggs and larvae; descriptions and figures of mature eggs and developing embryos and larvae.
- SASAKI, TAKEO.
1932. A consideration of albacore fishing conditions and oceanographic conditions north of Zunan. Rakusui 27(6):9-11. [J]
Germo alalunga: fishing conditions in relation to oceanography; Pacific Ocean-northwest.
- 1939a. Oceanographic conditions and the skipjack fishing grounds of the Northeastern Sea Area. Miyagi Pref. Fish. Exp. Sta., 12 p. (In: Spec. sci. Rep: Fish. U. S. Fish Wildl. 83). [P]
Katsuwonus pelamis: migrations; fishing conditions in relation to water temperature; Pacific Ocean-northwest.
- SASAKI, TAKEO.—Continued
1939b. Oceanographic conditions and the albacore grounds east of Cape Nojima. Miyagi Pref. Fish. Exp. Sta. 14 p. (In: Spec. sci. Rep: Fish. U. S. Fish Wildl. 77). [P]
Germo alalunga: fishing conditions related to water temperature; Pacific Ocean—northwest; catch statistics; sizes and putative age composition of fish in long-line and livebait catch; migrations.
- SASAKI, TAKEO, and ISAKU TAKEHISA.
1932. A consideration of the skipjack fishery in the Northeastern Sea Area in 1931. Rakusui 27(4):1-10. [J]
Pacific Ocean—northwest; *Katsuwonus pelamis*.
- SCAGEL, R. F.
1949. Report on the investigation of albacore. Circ. biol. stas. Nanaimo and Prince Rupert 17:23 p. [P]
Thunnus alalunga: catch in relation to oceanographic conditions in the northeast Pacific; size composition of commercial catch; stomach contents; tagging; body temperature.
- SCHAEFER, MILNER B.
1948a. Morphometric characteristics and relative growth of yellowfin tuna (*Neothunnus macropterus*) from the Central Pacific. Pacif. Sci. 2(2):114-120. [P]
Morphometric data; length-weight relation; growth; classification based on variations in dorsal and anal fin length.
- 1948b. Size composition of catches of yellowfin tuna (*Neothunnus macropterus*) from Central America, and their significance in the determination of growth, age, and schooling habits. Fish. Bull., U. S. Fish Wildl. 51(44):197-200. [P]
Size composition of commercial catch; sexual maturity; age, growth; schooling habits; length-frequency data from mixed school of skipjack and yellowfin tuna.
- 1948c. Spawning of Pacific tunas and its implications to the welfare of the Pacific tuna fisheries. Trans. N. Amer. Wildl. Conf. 13:366-371. [P]
Auxis sp., *Euthynnus lineatus*, *E. yaito*, *Katsuwonus pelamis*, *Neothunnus macropterus*, *Thunnus germo*: Pacific Ocean, distribution; review of records and observations on spawning and juveniles; management problem.
1951. Some recent advances in the study of the biology and racial division of Pacific tunas. Proc. Indo-Pacif. Fish. Coun. 2(2/3):63-69. [P]
Neothunnus macropterus, *Thunnus germo*,

SCHAEFER, MILNER B.—Continued

Katsuwonus pelamis, *Parathunnus sibi*, *Thunnus thunnina*, *Euthynnus lineatus*, *Auxis thazard*: general review of work on age and growth, morphometrics and racial studies, size composition, spawning.

1952. Comparison of yellowfin tuna of Hawaiian waters and of the American west coast. Fish. Bull., U. S. 52(72):353-373. [P]

Neothunnus macropterus: morphometrics, meristic counts, relative growth, definition of populations.

SCHAEFER, MILNER B., and J. C. MARR.

- 1948a. Juvenile *Euthynnus lineatus* and *Auxis thazard* from the Pacific Ocean off Central America. Pacif. Sci. 2(4):262-271. [P]

Anatomy, meristic counts, description, figures, and records of capture of juveniles.

- 1948b. Spawning of yellowfin tuna (*Neothunnus macropterus*) and skipjack (*Katsuwonus pelamis*) in the Pacific Ocean off Central America, with descriptions of juveniles. Fish. Bull. U. S. Fish Wildl. 51(44):187-195. [P]

Neothunnus macropterus: size composition in commercial catch; sexual maturity, spawning. *Katsuwonus pelamis*: sexual maturity, spawning; records of capture, descriptions and figures of *N. macropterus* and *Katsuwonus pelamis* juveniles.

SCHAEFER, MILNER B., and L. A. WALFORD.

1950. Biometric comparison between yellowfin tunas (*Neothunnus*) of Angola and of the Pacific coast of Central America. Fish. Bull., U. S. 51(56):425-443. [P]

Neothunnus albacora, *N. macropterus*: morphometrics, meristic counts, definition of populations; taxonomy.

SCHAEFERS, EDWARD A.

1952. North Pacific albacore tuna exploration, 1951. Comm. Fish. Rev. 14(5):1-12. [P]

Thunnus germo: results of exploratory trolling, longlining, gillnetting; fishing conditions in relation to water temperature and season; stomach contents noted; gear described; tagging.

1953. North Pacific albacore tuna exploration, 1952. Comm. Fish. Rev. 15(9):1-6. [P]

Thunnus germo: results of exploratory trolling and gillnetting; fishing conditions in relation to water temperature; description of gear; notes on size composition, stomach contents, tagging.

SCHMIDT, P.

1930. A check-list of the fishes of the Riu-Kiu Islands. J. Pan-Pacif. Res. Instn. 5(4):3. [P]
- Euthynnus alletteratus*: listed.

SCHMITT, WALDO L., and L. P. SCHULTZ.

1940. List of fishes taken on the Presidential Cruise of 1938. Smithsonian misc. Coll. 98(25):3.
- Euthynnus alletteratus*, *E. lineatus*: listed and compared.

SCHUCK, H. A.

1951. Northern record for the little tuna, *Euthynnus alletteratus*. Copeia 1951 (1):98. [P]
- Distributional note, eastern Atlantic Ocean.

SCHUCK, H. A., and J. F. MATHER, III.

1951. A blackfin tuna (*Parathunnus atlanticus*) from North Carolina waters. Copeia 1951 (3):248. [P]
- Distributional note.

SCHULTZ, LEONARD P.

1949. A further contribution to the ichthyology of Venezuela. Proc. U. S. nat. Mus. 99:1-211. [P]

Thunnus thynnus: listed; synonymy, English and Venezuelan common names.

SCHULTZ, LEONARD P. and A. C. DE LACY.

1936. A catalogue of the fishes of Washington and Oregon with distributional records and a bibliography. Mid-Pacif. Mag. 49(1):70-71. [P]

Germo alalunga, *Thunnus thynnus*: synonymy, distribution.

SCHWEIGGER, ERWIN.

1943. Pesquería y oceanografía del Perú y proposiciones para su desarrollo futuro. Lima, Perú, Compañía Administradora del Guano. 356 p.
- Bonito (*Sarda chilensis*): distribution; *Neothunnus macropterus*: description and distribution.

1949. El atún frente a la costa peruana. Bol. Comp. Admin. Guano 25(8):27 p. [P]

Thunnus macropterus: length frequency; length-weight relationship; distribution in Peruvian waters in relation to season, water temperature, currents; growth; food, sex ratios.

SCORDIA, C.

- 1930-1939. Per la biologia del tonno. Mem. Biol. mar. I, 1, 3; II, 1, 2; III, 1, 2, 3; IV, 2, 4, 5; V, 4, 5, 6, 7, 8; VI, 3.

Thunnus thynnus, Mediterranean Sea.

- 1939a. La biologia del tonno secondo Le Danois. Mem. Biol. mar. 6(4):1-4.

Thunnus thynnus, Mediterranean Sea.

- 1939b. Notizie sulle migrazioni dei tonni del basso Adriatico. Mem. Biol. mar. 6(1):1-7.

Thunnus thynnus: migrations.

1940. Le migrazioni dei tonni tirreno-jonici e l'entrata di essi in tonnara. Atti Conv. biol. mar. 2.

Thunnus thynnus: migrations, Tyrrhenian and Ionian seas; trap fishery.

SCORDIA, C.—Continued

1943. Prime indagini sul valore quantitativo delle concentrazioni gamiche del tonno (*Thunnus thynnus* L.) Boll. Zool. agr. Bachic. 14(1/3): 93-103.

Thunnus thynnus: age, spawning; Mediterranean Sea.

SEALE, ALVIN.

1940. Report on fishes from Allan Hancock Expeditions in the California Academy of Sciences. A. Hancock Pacif. Exped. 9(1): 17-18. [P]

Euthynnus lineatus, *Katsuwonus pelamis*, *Neothunnus macropterus*: descriptions, records of capture; Mexico to Galapagos.

SELLA, M.

1930. Distribution and migrations of the tuna (*Thunnus thynnus* L.) studied by the method of hooks and other observations. Int. Rev. Hydrobiol. 24:446-466.

See (Sella 1952).

1931. The tuna (*Thunnus thynnus* L.) of the western Atlantic. An appeal to fishermen for the collection of hooks found in tuna fish. Int. Rev. Hydrobiol. 25(1/2):46-47. [P]

Thunnus thynnus L. compared with *T. secundodorsalis* Storer; harpooning of tuna; distribution in western Atlantic, migrations.

1932. Studio sul tonno. Conferenza sulla pesca del tonno. Boll. Pesca Piscic. Idrobiol. 8(1): 68-73.

Thunnus thynnus.

1952. Migrations and habitat of the tuna (*Thunnus thynnus* L.), studied by the method of the hooks, with observations on growth, on the operation of the fisheries, etc. Spec. sci. Rep: Fish. U. S. Fish Wildl. 76:20 p. (Translation of R. Com. talass. It. Mem. 156, Venice, 1929). [P]

Migration, distribution, growth and age from vertebral annuli, spawning, phototropism of young, food, influence of salinity, cyclical fluctuations in abundance.

SERVENTY, D. L.

- 1941a. The Australian tunas. Pamphl. Coun. sci. ind. Res. Aust. 104:48 p. [P]

Auxis thazard, *Euthynnus alletteratus*, *Katsuwonus pelamis*, *Kishinoella tonggol*, *Neothunnus macropterus*, *Thunnus germo*, *T. maccoyi*: distribution, description, key, figures, Australian common names, size groups, migration and spawning of *T. maccoyi*; length-weight relationship and internal and external differences of *K. tonggol* and *T. maccoyi* compared; livers of *K. tonggol* and *T. maccoyi* figured.

SERVENTY, D. L.—Continued

- 1941b. Victorian tunas and some recent records. Vict. Nat., Melb. 58:51-55.

Southern bluefin (*T. maccoyi*), albacore (*T. germo*), yellowfin (*Neothunnus macropterus*), striped tuna (*Katsuwonus pelamis*), bonito (*Sarda australis*): recorded; description of *N. macropterus*.

- 1942a. Notes on the economics of the northern tuna (*Kishinoella tonggol*). J. Coun. sci. ind. Res. Aust. 15(2):94-100.

Distribution, feeding habits, stomach contents, spawning.

- 1942b. The tuna *Kishinoella tonggol* Bleeker in Australia. J. Coun. sci. ind. Res. Aust. 15(2): 101-112.

Distribution, description, ratios of various body proportions, internal anatomy, synonymy; compared with *K. zacalles*, *Neothunnus rarus*, *Thunnus nicolsoni*, *Thynnus tonggol*; figures of *T. tonggol* and *K. tonggol*, cranium of *K. tonggol* figured.

1947. A report on commercial tuna trolling tests in southeastern Australia. J. Coun. sci. ind. Res. Aust. 20(1):1-16.

Katsuwonus pelamis, *Thunnus germo*, *T. maccoyi*: catch per unit of effort; size composition of *T. maccoyi*.

1948. *Allothunnus fallai*, a new genus and species of tuna from New Zealand. Rec. Canterbury (N. Z.) Mus. 5(3):131-135.

Classification, description, morphometrics; internal anatomy of type specimen; records of specimens and occurrences; compared with *Katsuwonidae*.

SETTE, OSCAR E.

1954. Progress in Pacific Oceanic Fishery Investigations 1950-53. Spec. sci. Rep: Fish. U. S. Fish Wildl. 116:75 p. [P]

Brief summary of POFI tuna research in the central Pacific. Yellowfin: catch per unit of effort, fishing conditions in relation to area; size composition; spawning; growth; distribution of larvae; morphometrics, definition of populations. Skipjack: distribution, fishing conditions in relation to season and oceanographic features. Fishing methods: results of trolling, gillnetting, purse seining, livebait fishing, longlining.

SHAPIRO, SIDNEY.

- 1948a. Aquatic resources of the Ryukyu area. SCAP Nat. Resour. Sect. Rep. 117:54 p. Also Fish. Leafl., U. S. Fish Wildl., Wash. 333. [P]
- Auxis hira*, *A. tapeinosoma*, *E. yaito*, *Katsuwonus pelamis*, *Neothunnus macropterus*, *Parathunnus sibi*, *Thunnus germo*,

SHAPIRO, SIDNEY.—Continued

T. orientalis: bibliography, distribution, Ryukyuan common names, migration, spawning of *K. pelamis*.

1948b. The Japanese tuna fisheries. SCAP Nat. Resour. Sect. Rep. 104:60 p. [P]

Katsuwonus pelamis, *Neothunnus macrop-
terus*, *Thunnus germo*, *T. orientalis*: bibli-
ography, classification, description, distri-
bution, migration, food, habits, fishing
conditions in relation to oceanography,
figures, Japanese common names.

1950. The Japanese long-line fishery for tunas.
Comm. Fish. Rev. U. S. Fish Wildl. 12(4):1-26.
[P]

Details of construction, operation of gear.

SHIMADA, BELL M.

1951a. An annotated bibliography on the biology
of Pacific tunas. Fish Bull., U. S. Fish Wildl.
52(58):1-58. [P]

Arranged alphabetically by author, and
papers by the same author chronologically.
Detailed subject index.

1951b. Contributions to the biology of tunas from
the western equatorial Pacific. Fish. Bull.,
U. S. Fish Wildl. 52(62):111-119. [P]

Spawning of *Neothunnus macropterus* and
Parathunnus sibi; records of juvenile *Kat-
suwonus pelamis*; occurrence of *Thunnus
orientalis*.

1951c. Japanese tuna-mothership operations in
the western equatorial Pacific Ocean. Comm.
Fish. Rev. Fish Wildl. 13(6):1-26. Also Sepa-
rate No. 284. [P]

Description and operation of longline gear
with diagrams; total landings; composi-
tion of catch; mothership vessel opera-
tions.

1951d. Juvenile oceanic skipjack from the Phoe-
nix Islands. Fish. Bull., U. S. Fish Wildl. 52
(64):129-131. [P]

Descriptions of 5 specimens of *Katsuwo-
nus pelamis*; table of published records of
juvenile *K. pelamis* from Pacific Ocean.

1954. On the distribution of the big-eyed tuna,
Parathunnus sibi, in the tropical eastern Pacif-
ic Ocean. Pacif. Sci. 8(2):234-5. [P]

Distributional records; anatomical differ-
ences from *Neothunnus macropterus*.

SHIMIZU, WATARU.

1947. Seasonal changes in the composition of tuna
flesh. Bull. Jap. Soc. sci. Fish. 13(1): 27-28.
[Je,P]

Analysis of black tuna flesh for water,
ash, protein, and fat content.

SHIMODA, MOKUICHI.

1937. Southern fisheries. Kaiyō gyogyō 7:1-136.
[J,P]

General description and history of the ex-
ploration and the expansion of the Japa-
nese longline and livebait fisheries into
the Mandated Islands and Indonesian
waters; plan for mothership-type opera-
tions.

SHIZUOKA PREFECTURE FISHERIES EXPERIMENT STATION.

1936. Investigation of skipjack fishing. Shizuoka-
ken suisan shikenjō jigyo hōkoku (1934):
1-19. [J,P]

Skipjack catch in relation to water temp-
erature in Japanese waters.

1937a. Investigation of skipjack fishing. Shizu-
oka-ken suisan shikenjō jigyo hōkoku (1935):
259-285. [J,P]

Skipjack catch in relation to water tem-
perature in Japanese waters.

1937b. Albacore grounds of the central Pacific.
Kaiyō gyogyō 2(15):50-55. [J]

Thunnus germo, Pacific Ocean—northwest.

SIGMA.

1941. Spunti biologichi: perche non debba rite-
nersi che i nostri tonni ci vengano dall' Atlan-
tico. Corr. Pesca 15(21):1-2.

Thunnus thynnus: migrations; Atlantic,
Mediterranean.

SMITH, J. L. B.

1935. New and little known fishes from South
Africa. Rec. Albany Mus. 4:358-364.

Neothunnus itosibi: figure.

SMITH, OSGOOD R., and MILNER B. SCHAEFER.

1949. Fishery exploration in the western Pacific
(January to June 1948, by vessels of the
Pacific Exploration Company). Comm. Fish.
Rev. 11(3):1-18. [P]

Bigeye tuna, *Euthynnus yaito*, *Katsuwo-
nus pelamis*, yellowfin tuna; Hawaiian,
Line, former Japanese mandated islands,
occurrence recorded; *E. yaito* and *K. pela-
mis* figured.

SMITH, ROBERT O.

1947. Survey of the fisheries of the former Japa-
nese mandated islands. Fish. Leafl. U. S. Fish
Wildl. 273:89-95. [P]

Katsuwonus pelamis, *Neothunnus macrop-
terus*, *Thunnus germo*: Hawaiian and
Micronesian common names; livebait fish-
ing for *K. pelamis*.

SOCIETY FOR THE PROMOTION OF OCEANIC FISHERIES.

1936. Tunas. Kaiyō gyogyō 4:1-62. [J,P]

Germo alahunga: differences in quality of
summer and winter fish from the north-
west Pacific in relation to sexual maturity,
body condition, season; spawning, migra-

SOCIETY FOR THE PROMOTION OF OCEANIC FISHERIES.—
Continued

tion, location of fishing grounds in relation to oceanography; compared with *Thunnus orientalis*.

- 1937a. An investigation of the summer albacore fishing grounds. *Kaiyō gyogyō* 2(15): 1-4. [J]

Germo alalunga; Pacific Ocean—northwest.

- 1937b. Tuna fishery from the canning point of view. *Kaiyō gyogyō* 2(10):1-120. [J]
Japanese tuna fisheries.

SOLDATOV, V. K., and G. J. LINDBERG.

1930. A review of the fishes of the seas of the Far East. *Bull. Pacif. sci. Inst. Fish., Vladivostok* 5:103-109.

Auatis hira, *A. maru*, *Germo alalunga*, *Katsuwonus pelamis*, *Neothunnus macrop-terus*, *Thunnus thynnus*: classification, description, distribution, key, synonymy; keys to *Parathunnus* and *Kishinoella*; *Thunnus thynnus* figured.

ŠOLJAN, T.

1930. Tunolov u hrvatskim primorju. *Ribarski list* 1-2:7-12; 3-4:25-29.
Fishing gear and methods, Adriatic Sea.

SOUTH SEAS GOVERNMENT-GENERAL FISHERIES
EXPERIMENT STATION.

- 1937a. Investigation of the fisheries of the Mariana Islands, 1924. *Nanyō-chō suisan shikenjō jigyo hōkoku* 1 (1923-35):6-9. [J,P]
Distribution of yellowfin tuna and skipjack.

- 1937b. Investigation of the fisheries of the Marshall Islands, 1926-27. *Nanyō-chō suisan shikenjō jigyo hōkoku* 1 (1923-35):14-24. (Pacific Oceanic Fishery Investigations Translation No. 31. In: *Spec. sci. Rep.: Fish. U. S. Fish Wildl.* 47). [P]

Results of exploratory trolling and longlining for yellowfin and bigeye at several atolls; distribution.

- 1937c. Survey of fishing grounds and channels in Palau waters, 1925-26. *Nanyō-chō suisan shikenjō jigyo hōkoku* 1 (1923-35):25-37. (Pacific Oceanic Fishery Investigations Translation No. 5. In: *Spec. sci. Rep.: Fish. U. S. Fish Wildl.* 42). [P]

Results of exploratory trolling and livebait fishing close to the islands; distribution of dogtooth tuna, frigate mackerel, skipjack; bait survey; fishing seasons.

- 1937d. An investigation of the waters adjacent to Ponape. *Nanyō-chō suisan shikenjō jigyo hōkoku* 1 (1923-35):78-83. (Pacific Oceanic Fishery Investigations Translation No. 12.

SOUTH SEAS GOVERNMENT-GENERAL FISHERIES
EXPERIMENT STATION.—Continued

In: *Spec. sci. Rep.: Fish. U. S. Fish Wildl.* 46). [P]

Results of exploratory trolling and longlining; skipjack livebait survey.

1938. Report of oceanographical investigations, 1927-37. Palau, March 1938, 124 p. [J,P]
Skipjack, yellowfin tuna: catch in relation to oceanographic factors, especially water temperature; catch statistics for mandated islands.

- 1941a. Experimental tuna fishing in waters adjacent to Woleai. *Nanyō-chō suisan shikenjō jigyo hōkoku* (1936):8-12. [J,P]
Yellowfin, bigeye tuna, skipjack: distribution.

- 1941b. Investigation of skipjack fishing in the central Caroline Islands. *Nanyō-chō suisan shikenjō jigyo hōkoku* (1937):63-68. [J,P]
Release of tagged skipjack recorded.

- 1941c. Investigation of skipjack fishing in Yap waters. *Nanyō-chō suisan shikenjō jigyo hōkoku* (1937):69-75. [J,P]
Skipjack length-weight data, body condition.

- 1941d. Investigation of tuna fishing in waters adjacent to foreign territories. *Nanyō-chō suisan shikenjō jigyo hōkoku* (1936):17-26. [J,P]

Indonesian waters: yellowfin tuna catch in relation to oceanographic conditions.

1942. Report of a survey of the tuna fishery in Palau waters. *Nanyō suisan jōhō* 6(1):10-13. (Pacific Oceanic Fishery Investigations Translation No. 4. In: *Spec. sci. Rep.: Fish. U. S. Fish Wildl.* 42). [P]

Yellowfin, bigeye tuna, skipjack: records of catches at 11 longlining stations off Palau in relation to surface and subsurface water temperatures and currents.

- 1943a. Investigation of albacore fishing in the central Pacific Ocean. *Nanyō-chō suisan shikenjō jigyo hōkoku* (1939):1-13. [J,P]

Results of 3 exploratory longlining cruises around Saipan, Marcus, and Wake Islands; yellowfin and albacore catches, average, maximum, and minimum length, weight, body depth for each station; subsurface temperatures; gear construction, operational data, station plots.

- 1943b. Report of the investigation of tuna fishing in waters adjacent to Palau. *Nanyō suisan jōhō* 7(1):2-4. [J,P]

Skipjack, yellowfin: fishing conditions in relation to currents and water temperature.

SUDA, AKIRA.

1953. Juvenile skipjack from the stomach contents of tunas and marlins. Bull. Jap. Soc. sci. Fish. 19(4):319-340. [Je,P]

Records of juvenile skipjack collected from stomachs of longline-caught yellowfin, bigeye, and marlin in Bonin, Caroline, Marshall, and Midway areas; summary of past records; figures and measurements of juveniles; notes on seasonal occurrence; seasonal changes in size composition of juveniles; rough analysis of average stomach contents of yellowfin and bigeye in various areas.

SUGIURA, YASUKICHI.

1932. The Kushiro tuna fishery under the application of catch restrictions. Suisankai 594:15-21. [J]

Thunnus orientalis; laws and regulations, Pacific Ocean—northwest.

SUYEHIRO, YASUO.

1936. The reasons why the bonito does not take to baits. Fish. Invest. (Suppl. Rep.) Imp. Fish. Exp. Sta. 3(31):14-16. [J,P]

Skipjack: stomach anatomy, stomach contents; length, weight, body condition; fish from different schools compared.

1938. The study of finding the reasons why the bonito does not take to the angling baits. J. Imp. Fish. Exp. Sta. 9(69):87-101. [Je,P]

Skipjack: stomach anatomy, stomach contents, food organisms figured.

1941. On the islets of Langerhans of teleost fishes. J. Imp. Fish. Exp. Sta. 11(82):121-138. [Je,P]

Germo germo, *Katsuwonus vagans*, *Neothunnus macropterus*, *Parathunnus sibi*.

1942. A study of the digestive system and feeding habits of fish. Jap. J. Zool. 10(1):1-303.

Katsuwonus vagans, *Neothunnus macropterus*, *Parathunnus sibi*, *Thunnus orientalis*: digestive system described, analysis of stomach contents; digestive system of *K. vagans*, *N. macropterus*, *T. orientalis* figured.

1950. On the pituitary body of the skipjack. Bull. physiogr. Sci. Res. Inst. Tokyo Univ. 6(9?):25-27. [J]

Katsuwonus pelamis: anatomy.

TACHIKAWA, TAKUITSU.

1932. The rise and decline of the skipjack fishery in Ryukyu waters. Suisankai 590:93-103; 591:18-26. [J]

Katsuwonus pelamis; Pacific Ocean—northwest

TAIHOKU PROVINCE FISHERIES EXPERIMENT STATION.

1932. Report of the investigation of skipjack fishing grounds. Taihoku-shū suisan shikenjō gyōmu hōkoku 7(1930)1932:1-17. [J,P]

Ryukyu Islands: skipjack fishing conditions in relation to water temperature and color.

TAKAYAMA, I., and S. ANDŌ.

1934. A study of the "magro" (*Thunnus*) fishing in 1930. J. Imp. Fish. Exp. Sta. 5(38):1-21. [Je,P]

Neothunnus macropterus, *Parathunnus mebachi*, *Thunnus germo*, *T. orientalis*: fishing conditions in relation to surface water temperature; optimum temperatures for occurrence of fish recorded.

TAKAYAMA, I., ET AL.

1934. A study of the "katsuwo" (*Katsuwonus pelamis*) fishing in 1930. J. Imp. Fish. Exp. Sta. 5(39):23-56. [Je,P]

Fishing conditions in relation to surface water temperature; temperature range and optimum temperature for occurrence of fish recorded.

TANAKA, SHIGEHO.

1931. On the distribution of fishes in Japanese waters. J. Fac. Sci. Tokyo Univ. 3(1, Sec. 4):22, 50.

Auxis hira, *Euthynnus alletteratus*, *E. pelamys*, *Germo macropterus*, *Parathunnus sibi*, *Thynnus alalunga*, *T. thynnus*: distribution; synonymy.

1935. A new theory concerning the habits of the snapper and the tuna. Shokubutsu oyobi dōbutsu 3(11):1929-1930. [J]

Habits.

1936. Tuna of the Japan Sea. Suisankai 639:51-54. [J]

1939. The black tuna problem. Suisankai 684:44-47. [J]

Thunnus orientalis, Pacific Ocean—northwest.

TAPIADOR, DOMINGO D.

1951. A report on deep-sea longline fishing for tuna in the Bull. Fish. Soc. Philipp. 2:3-27.

Yellowfin tuna: fishing conditions in relation to water depth, temperature, salinity.

TARANETZ, A. R.

1937. Handbook for the identification of fishes of Soviet Far East and adjacent waters. Bull. Pacif. sci. Inst. Fish., Vladivostok 11:86-87.

Auxis hira, *A. maru*, *Germo alalunga*, *Katsuwonus pelamis*, *Neothunnus macropterus*, *Thunnus thynnus*: classification, distribution, key.

TAUCHI, MORISABURO.

1940a. On the stock of *Thunnus orientalis* (T. and S.). Bull. Jap. Soc. sci. Fish. 9(4):133-135. (Pacific Oceanic Fishery Investigations Translation No. 35. In: Spec. sci. Rep.: Fish. U. S. Fish Wildl. 16). [P]

Survival rates, rates of exploitation, age and size composition.

1940b. On the stock of *Neothunnus macropterus* (T. and S.). Bull. Jap. Soc. sci. Fish. 9(4):136-138. (Pacific Oceanic Fishery Investigations Translation No. 35. In: Spec. sci. Rep.: Fish. U. S. Fish Wildl. 16). [P]

Survival rates, rate of exploitation, age and size composition, migration, population analysis.

1940c. On the stock of *Germo germo* (Lacépède). Bull. Jap. Soc. sci. Fish. 9(4):139-141. (Pacific Oceanic Fishery Investigations Translation No. 35. In: Spec. sci. Rep.: Fish. U. S. Fish Wildl. 16). [P]

Survival rates, rate of exploitation, age and size composition.

1943. On the stock of *Euthynnus vagans* (Lesson). Bull. Jap. Soc. sci. Fish. 11(5/6):179-183. (Translation in Spec. sci. Rep.: Fish. U. S. Fish Wildl. 83). [P]

Definition of populations based on age (according to Aikawa's method) and size composition of landings from Japanese and Palau waters.

TESTER, ALBERT L., ET AL.

1952. Establishing tuna and other pelagic fishes in ponds and tanks. Spec. sci. Rep.: Fish. U. S. Fish Wildl. 71:20 p. [P]

Neothunnus macropterus, *Katsuwonus pelamis*, *Euthynnus yaito*, *Auxis thazard*: trolling catch per unit of effort in Hawaiian waters; behavior in captivity.

1952. Reaction of tuna and other fish to stimuli, 1951. Spec. sci. Rep.: Fish. U. S. Fish Wildl. 91:83 p. [P]

Neothunnus macropterus, *Euthynnus yaito*: behavior in captivity; responses to flesh extracts and chemicals, light, and sound; sound production.

THIEL, HANS.

1938. Thunfisch und Thunfischfang. Fischmarkt 6. Fishing methods and gear, tuna.

TINKER, SPENCER W.

1944. Hawaiian fishes. Honolulu, Tongg Publ. Co., p. 154-160. [P]

Auxis thazard, *Euthynnus alletteratus*, *E. pelamis*, *Germo alahunga*, *Neothunnus macropterus*, *Parathunnus sibi*, *Semathunnus itosibi*, *Thunnus orientalis*, *T.*

TINKER, SPENCER W.—Continued

thynnus: description, distribution; figures for all except *S. itosibi*; English, Hawaiian, Japanese, and European common names.

TOMINAGA, SEIJIRŌ.

1943. Bonitos. Kaiyō no kagaku 3(10):460-465. [J]

Frigate mackerels, black skipjack: descriptions, distribution, habits, food, Japanese common names; migration and population analysis of Japanese skipjack stock.

TOMIYAMA, TETSUO.

1933. The chemical composition of tunny liver oil. Bull. Jap. Soc. sci. Fish. 2(1):1-7 [Je,P]
Black tuna: chemical analysis.

TOYAMA, YUZŌ, ET AL.

1941. Studies on fish in Japan as a source of insulin. Bull. Jap. Soc. sci. Fish. 10(4):153-155. [P]

Germo germo, *Katsuwonus pelamis*, *Neothunnus macropterus*, *Parathunnus sibi*: yields of insulin.

TUBB, J. A.

1948. Whale sharks and devil rays in North Borneo. Copeia 1948 (3):222.

Euthynnus macropterus: recorded.

UCHIDA, KEITARŌ.

1937. On flotation structures seen in planktonic larvae of fishes, I, II. Kagaku 7:540-546, 591-595. [J]

Tunas: young.

UCHIHASHI, KIYOSHI.

1953. Ecological study of Japanese teleosts in relation to the brain morphology. Bull. Japan Sea reg. Fish Res. Lab. 2:166 p. [Je,P]

Morphology of brain of *Katsuwonus pelamis* and *Auxis tapeinosoma*: described, figured, and discussed in relation to the habits and ecology of the fish.

UDA, MICHITAKA.

1931a. A consideration of Zunan albacore fishing conditions and oceanographic conditions. Suisan butsuri danwakai kaihō 27:413-416. [J]

Thunnus germo: fishing conditions in relation to oceanography; Pacific Ocean—northwest.

1931b. Studies of skipjack fishing conditions north of Zunan in 1930. Suisan butsuri danwakai kaihō 2. [J]

Katsuwonus pelamis. Pacific Ocean—northwest.

1932a. On the body weight of some scombroid fishes of Japan. Bull. Jap. Soc. sci. Fish.

UDA, MICHITAKA.—Continued

1(3):124-129. [Je,P]

Thunnus thynnus, *Euthynnus vagans*: seasonal variations in size composition.

- 1932b. A study of the body weight of yellowtail, young black tuna, cybiids, and skipjack. *Suisan butsurei danwakai kaihō* 35:610-619. [J]
Thunnus orientalis, *Katsuwonus pelamis*: size composition.
1933. The shoals of "Katuwo" and their angling. *Bull. Jap. Soc. sci. Fish* 2(3):107-111. (Translation in *Spec. sci. Rep.: Fish. U. S. Fish Wildl.* 83). [P]
Euthynnus vagans: distribution, density, biting qualities of schools in Japanese waters in relation to salinity, stomach contents, and objects with which associated; catch per unit of effort in livebait fishery.
- 1935a. On the estimation of favorable temperature for longline fishing of tunny. *Bull. Jap. Soc. sci. Fish.* 4(1):61-65. (Pacific Oceanic Fishery Investigations Translation No. 44. In: *Spec. sci. Rep.: Fish. U.S. Fish Wildl.* 52). [P]
Germo macropterus, *Parathunnus sibi*, *Thunnus alalunga*, *T. thynnus*: distribution in relation to water temperature in Japanese waters.
- 1935b. The results of simultaneous oceanographical investigations in the North Pacific Ocean adjacent to Japan made in August 1933. *J. Imp. Fish. Exp. Sta.* 6(43):1-130. [Je,P]
Euthynnus vagans: fishing conditions and distribution in relation to oceanographic conditions; size composition of schools and commercial catch; habits.
- 1935c. Skipjack schools congregating along current boundaries. *Kagaku* 5(12):503-504. [J]
Katsuwonus pelamis: fishing conditions in relation to oceanography.
- 1936a. Locality of fishing centre and shoals of "katuwo" *Euthynnus vagans* (Lesson) correlated with the contact zone of cold and warm currents. *Bull. Jap. Soc. sci. Fish.* 4(6):385-390. [Je,P]
Euthynnus vagans: occurrence and migration in relation to water temperatures in Japanese waters; recoveries of tagged skipjack noted.
- 1936b. The winter albacore grounds and the subtropical convergence. *Kagaku* 6:416-417. [J]
Germo alalunga: fishing in relation to oceanographic conditions.
1938. Correlation of the catch of "Katuwo" in the waters adjacent to Japan. *Bull. Jap. Soc. sci.*

UDA, MICHITAKA.—Continued

Fish. 7(2):75-78. [Je,P]*Katsuwonus pelamis*: amount and distribution of catch in Japanese waters in relation to annual variation in water temperature and amount of early season landings.

1939. On the characteristics of the frequency curve for the catch of "katuo" *Euthynnus vagans* (Lesson) referred to the water temperature. *Bull. Jap. Soc. sci. Fish.* 8(4):169-172. [Je,P]
Catches correlated with water temperature off Japan.
- 1940a. A note on the fisheries condition of "katuo" as a function of several oceanographic factors. *Bull. Jap. Soc. sci. Fish.* 9(4):145-148. (Pacific Oceanic Fishery Investigations Translation No. 45. In: *Spec. sci. Rep.: Fish. U. S. Fish Wildl.* 51). [P]
Euthynnus vagans: occurrence of fish in relation to oceanographic factors; catch of *E. vagans* correlated with temperature, salinity, transparency and food supply of sardines and copepods.
- 1940b. On the recent anomalous hydrographical conditions of the Kuroshio in the south waters off Japan proper in relation to the fisheries. *J. Imp. Fish. Exp. Sta.* 10(74):231-278. [Je,P]
Albacore, black tuna, skipjack: fishing conditions in relation to movements of water masses.
- 1940c. The time and duration of angling and the catch of "katuo," *Euthynnus vagans* (Lesson). *Bull. Jap. Soc. sci. Fish.* 9(3):103-106. (Pacific Oceanic Fishery Investigations Translation No. 46. In: *Spec. sci. Rep.: Fish. U. S. Fish Wildl.* 51). [P]
Diurnal feeding activity and length of fishing time per school as they affect the catch.
1941. The body temperature and bodily features of "katuo" and "sanma." *Bull. Jap. Soc. sci. Fish.* 9(6):231-236. (Pacific Oceanic Fishery Investigations Translation No. 51. In: *Spec. sci. Rep.: Fish. U. S. Fish Wildl.* 51). [P]
Body temperatures of skipjack correlated with water temperature; proportional body measurements analyzed.
1948. On the oceanographic conditions of the summer of 1942 and the abnormal skipjack fishing conditions. *Oyō kishō* 3(1):? [J]
Katsuwonus pelamis: fishing conditions in relation to oceanography.
1952. On the relation between the variation of the important fisheries conditions and the

UDA, MICHITAKA.—Continued

oceanographical conditions in the adjacent waters of Japan 1. J. Tokyo Univ. Fish. 38(3):363-389. [Je,P]

Relation between fluctuations of *Thunnus orientalis* abundance and oceanographic conditions in southern Japanese waters; relation between *Neothunnus macropterus* fishing grounds in the equatorial Pacific and hydrographic fluctuations.

UDA, MICHITAKA, and EIMATSU TOKUNAGA.

1937. Fishing of *Germo germo* (Lacépède) in relation to the hydrography in the North Pacific waters (Rep. 1). Bull. Jap. Soc. sci. Fish. 5(5):295-300. [Je,P]

Annual variations in catch of summer and winter fisheries related to oceanic circulation and water temperatures; hypothetical relationships of stocks on Japanese and mid-Pacific grounds.

UDA, MICHITAKA, and JIRŌ TSUKUSHI.

1934. Local variations in the composition of various shoals of "Katuwo," *Euthynnus vagans* (Lesson), in several sea-districts of Japan. Bull. Jap. Soc. sci. Fish. 3(4):196-202. (Translation in Spec. sci. Rep.: Fish. U. S. Fish Wildl. 83). [P]

Size composition of the catch on various Japanese grounds; association of schools of different character with different objects and organisms; definition of populations in Japanese fishery.

UDA, MICHITAKA, and N. WATANABE.

1938. Autumnal fishing of skipper and bonito influenced by the rapid hydrographical change after the pass of cyclones. Bull. Jap. Soc. sci. Fish. 6(5):240-242. [Je,P]

Effects of cyclones on water temperature and indirectly on location of skipjack fishing grounds in Japanese waters.

UEHARA, TOKUZŌ.

1941. A survey of tuna grounds in equatorial waters. Nanyō suisan jōhō 5(3):13-17. (Pacific Oceanic Fishery Investigations Translation No. 14: Spec. sci. Rep.: Fish. U. S. Fish Wildl. 45). [P]

Bigeye tuna, skipjack, yellowfin tuna: catches and catch rates at 6 longlining stations off N. Guinea and Halmahera; water temperatures and currents recorded.

U. S. FISH AND WILDLIFE SERVICE,
BRANCH OF COMMERCIAL FISHERIES.

Quarterly outlook for marketing fishery products. (This appears as Fish. Leaflet, U. S. Fish Wildl., Wash. 336 and began with April 1949).

Gives statistics on the general fishery situation, and also on specific marketing situations, such as for tunas.

U. S. FISH AND WILDLIFE SERVICE,
BRANCH OF COMMERCIAL FISHERIES,
MARKET NEWS SERVICE.

Fishery Products Report, San Pedro, Calif. [P]
Fishery Products Report, Seattle, Washington. [P]
Daily mimeographed reports on various fisheries, including tuna.

Monthly summary—Fishery products. San Pedro, Calif. [P]

California cannery receipts and pack of tuna, mackerel and anchovies; U. S. imports into Arizona and California, and other information.

U. S. FISH AND WILDLIFE SERVICE,
BRANCH OF COMMERCIAL FISHERIES,
MARKET NEWS SERVICE, SAN PEDRO, CALIF.
California fisheries. (Annually). [P]

California receipts, comparison by year—also by month comparing 3-year period—of tuna and tuna-like fishes: albacore, skipjack, yellowfin, bonito, yellowtail in tons; imports of frozen tuna by tons; California ex-vessel prices for tuna and tuna-like fishes in dollars per ton; canned tuna prices; California pack of tuna and tuna-like fishes with comparative data.

UNO, MICHIO.

1936a. *Germo germo* (Lacépède) in the waters east of Nozima promontory, Tiba Prefecture (Prelim. Rep. No. 1). Bull. Jap. Soc. sci. Fish. 4(5):307-309. [Je,P]

Size and age composition (by vertebral annuli); length-weight relationship of pole-and-line-caught fish from Japanese waters.

1936b. *Germo germo* (Lacépède) in the waters east of Nozima promontory, Tiba Prefecture (Prelim. Rep. No. 2). Bull. Jap. Soc. sci. Fish. 5(4):235. [Je,P]

Size and age composition (by vertebral annuli); length-weight relationship of pole-and-line-caught fish from Japanese waters.

VAN CAMPEN, W. G.

1952. Japanese mothership-type tuna fishing operations in the western equatorial Pacific, June-October 1951 (Report on the seventh, eighth, and ninth expeditions). Comm. Fish. Rev. U. S. Fish Wildl. 14(11):1-9. [P]

Catch rates for each expedition given: *Neothunnus macropterus*, *Parathunnus sibi*, *Thunnus germo*, *Thunnus orientalis*, *Katsuwonus pelamis*.

1953. Tuna fishing at Tahiti. Comm. Fish. Rev. 15(10):1-4. Also Separate No. 358. [P]
Methods of capture; description of industry.

VAN CAMPEN, W. G., and B. M. SHIMADA.

1951. The Japanese albacore fishery of the north central Pacific. Fish. Leaflet, U. S. Fish. Wildl., Wash. 388. [P]

Charts of area covered by Japanese albacore explorations prior to the war; Japanese longline gear used in albacore fishing.

VAN CLEAVE, HARLEY J.

1940. The Acanthocephala collected by the Allan Hancock Expedition, 1934. A. Hancock Pacif. Exped. 2(15):512.

Euthynnus alletteratus and *Katsuwonus pelamis* listed as hosts.

VITLOV, V.

1949. Ribolov na moru (Razvoj tehnike tunolova kod nas). Ribarski kalendar: 120-123.
Fishing gear and methods, Adriatic Sea.

WADE, CHARLES B.

1949. Notes on the Philippine frigate mackerels, family Thunnidae, Genus *Auxis*. Fish. Bull., U. S. Fish Wildl. 51(46):229-240. [P]

Auxis tapeinosoma, *A. thazard*: classification, description, key, synonymy, distribution, counts of meristic characters, records and descriptions and figures of juveniles.

- 1950a. Juvenile forms of *Neothunnus macropterus*, *Katsuwonus pelamis*, and *Euthynnus yaito* from Philippine seas. Fish. Bull., U. S. Fish Wildl. 51(53):395-404. [P]

Description, figures.

- 1950b. Observations on the spawning of Philippine tuna. Fish. Bull., U. S. 51(55):409-423. [P]

Classification of gonads; *Euthynnus yaito*, *Katsuwonus pelamis*, *Neothunnus macropterus*: tables showing locality, length, sex, degree of maturity, and gonad weight.

1951. Larvae of tuna and tuna-like fishes from Philippine waters. Fish. Bull., U. S. Fish Wildl. 51(57):445-485. [P]

Five genera, embracing four known species, of larvae previously unknown in the western Pacific are described and illustrated: *Grammatorcynus bicarinatus*, *Neothunnus macropterus*, *Katsuwonus pelamis*, *Euthynnus yaito*, and *Auxis* sp.; distribution and abundance of larvae, spawning areas, diurnal vertical migration.

WALFORD, LIONEL A.

1931. Handbook of common commercial and game fishes of California. Fish. Bull., Sacramento 28:74-77. [P]

Germo alalunga, *Katsuwonus pelamis*, *Neothunnus macropterus*, *Thunnus thynnus*: classification, English common names, description, figures, key.

WALFORD, LIONEL A.—Continued

1937. Marine game fishes of the Pacific coast—Alaska to the Equator. Berkeley, Univ. of California Press, p. 1-20, 20-30.

Euthynnus lineatus, *Germo alalunga*, *Katsuwonus pelamis*, *Neothunnus macropterus*, *Thunnus thynnus*: description, distribution, food, spawning, key, English common names, figures. *Auxis thazard*: description, distribution, English common names, figure, key. Migration of *G. alalunga*, *K. pelamis*, and *N. macropterus*. *N. macropterus* compared with Allison's tuna.

WARFEL, H. E.

1950. Outlook for development of a tuna industry in the Philippines. Res. Rep. U. S. Fish. Wildl., 28:37 p. [P]

History of Philippine tuna fishery; recent exploration for tuna (live bait fishing experiments, longline trawl experiments, trolling experiments, traps). Descriptions of *Neothunnus macropterus*, *Katsuwonus pelamis*, *Euthynnus yaito*, *Auxis thazard*, *Grammatorcynus bicarinatus*, *Gymnosarda nuda*, *Sarda orientalis*. For each species mentioned: distribution, figure, and description.

WATANABE, HAJIME.

1939. Investigation of albacore. Shizuoka-ken suisan shikenjō jigyo hōkoku (1936-38) 1939: 22-23. [J,P]

Albacore: mid-Pacific; stomach contents, sexual maturity, body proportions of males and females compared, morphometric data, probable spawning season, area, number of eggs.

WATANABE, HARUO.

1940. Fishing conditions south of the Marshall Islands. Nanyō suisan 58, March 25, 1940; No. 59, April 25, 1940; No. 60, May 25, 1940. (Pacific Oceanic Fishery Investigations Translation No. 11. In: Spec. sci. Rep.: Fish. U. S. Fish Wildl. 43). [P]

Narrative report of an exploratory longline fishing cruise from Jaluit to the Solomons and back. Some oceanographic information and lengths and weights of the fish taken. Bigeye tuna, yellowfin tuna.

WATANABE, NOBUO.

1941. Measurements on the bodily density, body temperature and swimming-velocity of "Katuwo," *Euthynnus vagans* (Lesson). Bull. Jap. Soc. sci. Fish. 11(4):146-148. [J,P]

Body volume and weight for three specimens, temperature immediately after capture for 10, and swimming speeds of 10 as timed from a fishing boat; body temperatures compared with water temperatures.

WELSH, JAMES P.

- 1949a. A preliminary study of food and feeding habits of Hawaiian kawakawa, mahimahi, ono, aku, and ahi. *Fish. Progr. Rep.* 1(2):26 p. [P]

Quantitative analyses of stomach contents of *Euthynnus yaito*, *Neothunnus macropterus*, and *Katsuwonus pelamis* from Hawaiian waters; food organisms listed, numbers and volumes given for each.

- 1949b. Range extension of the file fish *Monocanthus melanocephalus*. *Pacif. Sci.* 3(1):100. [P]

Hawaii: specimens recovered from *Euthynnus yaito*.

- 1949c. A trolling survey of Hawaiian waters. *Fish. Res. Progr. Rep.* 1(4):30 p. [P]

Trolling catch per unit of effort for *Euthynnus yaito*, *Neothunnus macropterus*, and *Katsuwonus pelamis*; fishing areas and lures compared.

WESTMAN, J. R., and P. W. GILBERT.

1941. Notes on age determination and growth of the Atlantic bluefin tuna, *Thunnus thynnus* L. *Copeia* 1941:70-72.

Thunnus thynnus: scale reading, age-length relationship; measurements taken from 100 tuna off Long Island in 1938.

WESTMAN, JAMES R., and WILLIAM C. NEVILLE.

1942. The tuna fishery of Long Island. New York, Board of Supervisors, Nassau County. 30 pp.

Thunnus thynnus: scale reading, age-fishing methods described—trolling, hand-lining; catch per unit of effort; length frequency; length-weight relationship; age and growth; scale reading, maturity, tagging; Atlantic.

WHITEHEAD, S. S.

1930. California bluefin tuna. *Calif. Fish Game* 16(3):231-233.

Thunnus thynnus: distribution.

1931. Fishing methods for the bluefin tuna (*Thunnus thynnus*) and an analysis of the catches. *Fish. Bull. Sacramento* 33:32 p. [P]

Classification, distribution, figure, migration, spawning, catch per unit of effort.

WHITLEY, GILBERT P.

1937. The Middleton and Elizabeth Reefs, South Pacific Ocean. *Aust. Zool.* 8(4):229-231.

Wanderer wallisi proposed as new genus and species; synonymy, description, food; compared with *E. yaito* and *E. alletteratus*.

1947. New sharks and fishes from Western Australia. *Aust. Zool.* 11(2):129-150.

WHITLEY, GILBERT P.—Continued

Euthynnus alletteratus, *Katsuwonus pelamis*, *Kishinoella tonggol*, *Neothunnus macropterus*, *Thunnus maccoyi*: recorded. Australian common names.

WILSON, ROBERT C.

1953. Tuna marking, a progress report. *Calif. Fish Game* 39(4):429-442. [P]

History of tagging of tuna, present tagging methods, tag application methods. Figures of various types of tags.

WOLFE MURRAY, D. K.

1932. Tunny (*Thunnus thynnus* L.) in the North Sea. *J. Cons. int. Explor. Mer* 7(2):251-254.

[P]

Some observations made by the author during his voyages as to occurrence, habits, and food of *T. thynnus*. A table is given showing the first and last appearances in the seasons of 1923-31.

YABE, HIROSHI.

1953. Juveniles collected from South Seas by Tenyo Maru at her second tuna research voyage (preliminary report). *Contrib. Nankai reg. Fish. Res. Lab.* 1, *Contrib.* 25:14 p. [J,P]

Surface trawl and night-light collections in the Carolines area include 2 *Katsuwonus pelamis* and 4 unidentified scombriform larvae; description, measurements, and figure of a 5.2-mm. *Katsuwonus pelamis*.

YABE, HIROSHI, NOBORU ANRAKU, and TOKUMI MORI.

1953. Scombroid youngs found in the coastal seas of Aburatsu, Kyushu, in summer. *Contrib. Nankai reg. Fish. Res. Lab.* 1, *Contrib.* 11:10 p. [J,P]

Young *Katsuwonus pelamis*, *Euthynnus yaito*, *Auxis tapeinosoma*, *Thunnus orientalis*, *Neothunnus macropterus*, *Sarda orientalis*, and *Auxis hira* taken by various gear in coastal waters; fishing conditions correlated with oceanography; habits, food, size composition, morphometrics.

YABE, HIROSHI, and TOKUMI MORI.

1948. Report of skipjack investigations for 1947. *Cent. Fish. Exp. Sta. Rep.* 30. [P]

Ryukyu Islands: length-weight data, stomach contents, catch correlated with water temperature; maturity of gonads, age analysis, spawning season, estimated number of eggs, past records of juveniles captured.

1950. An observation on the habit of bonito, *Katsuwonus vagans*, and yellowfin, *Neothunnus macropterus*, school under the drifting timber on the surface of ocean. *Bull. Jap. Soc. sci. Fish.* 16(2):35-39. [Je,P]

YABE, HIROSHI, and TOKUMI MORI.—Continued

Katsuwonus pelamis, *Neothunnus macrop-
terus*: ecology; live-bait fishing; yellowfin
length frequencies.

YABUTA, YŌICHI.

1953. On the stomach contents of the tuna and
marlin from the adjacent seas of Bonin Islands.
Contrib. Nankai reg. Fish. Lab. 1, Contrib.
15:6 p. [J,P]

Lists and gives numbers of organisms
found in 76 longline-caught albacore, big-
eye, and yellowfin tuna stomachs (no
volumes); describes food organisms; dis-
cusses seasonal differences in stomach
contents, relation to oceanographic condi-
tions; young skipjack as food.

YABUTA, YŌICHI and SHŌJI UEYANAGI.

1953a. The distributions of tunas in the equatorial
region. I. Contrib. Nankai reg. Fish. Res.
Lab. 1, Contrib. 28:8 p. [Je,P]

Distribution and migration of yellowfin,
bigeye, and black marlin in southern Mar-
shalls area as shown by longline catch
rates of mothership fleet; seasonal
changes in size composition of yellowfin;
fishing conditions correlated with oceanog-
raphic conditions.

1953b. The distribution of tunas in the equatorial
region. II. Hooked-rate of yellowfin tuna.
Contrib. Nankai reg. Fish. Res. Lab. 1, Con-
trib. 29:6 p. [J,P]

Longline catch rates of yellowfin tuna
from mothership fleet operations in south-
ern Carolines waters related to locality,
hydrography, time, and size composition.

YAMAMOTO, SHIGEO.

1933. Points of information for the skipjack fish-

YAMAMOTO, SHIGEO.—Continued

ery gained from the study of fish's eyes.
Rakusui 28(11):927-930. [J]
Skipjack: anatomy.

1934. Points of information for the skipjack fish-
ery gained from the study of fish's eyes.
Rigakkai 32(1):28. [J]
Skipjack: anatomy.

YAMAMOTO, SHŌKICHI.

1940. Views on increasing the commercial value
of dried fish sticks from the South Seas.
Nanyō suisan 3(11):21-35. [J,P]
Skipjack: Japan, Formosa, South Seas;
proportional weights of various body
parts.

YAMANAKA, ICHIRŌ.

1950. On the size composition of skipjack in the
Northeastern Sea area. Nippon kaiyōgakkai
shi 5(214). [J]

YONEZAWA, MATSUNOSUKE.

1950. Skipjack fishing experiences. Kaiyō no
kagaku 6(1):47-49. [J]
Skipjack, Japanese waters.

YOSHIHARA, TOMOKICHI.

1951-52. Distribution of fishes caught by the long-
line. I. Horizontal distribution. II. Vertical
distribution. III. Determination of the swim-
ming depth. Bull. Jap. Soc. sci. Fish. 16(8):
367-369; 16(8):370-374; 18(5):187-190. [Je,P]
Statistical study comparing catch rates
on different parts of longline sets; rela-
tive swimming depths of *Germo germo*,
Parathunnus sibi, and spearfishes deduced
from estimated depths of hooks on which
captured.

ZEI, M.

1948. Život našeg Jadrana. 220 p.
Tuna, Adriatic Sea.

INDEX BY SUBJECTS

Adriatic Sea

Fortunić, 1930.
Hadži, 1934.
Hirtz, 1933.
Milić, 1937.
Morović, 1950.
Scordia, 1939b.
Soljan, 1930.
Vitlov, 1949.
Zei, 1948.

Age

Brock, 1943.
Conseil International pour l' Exploration de la Mer, 1933.
Heldt, 1950.
Higashi, 1941.
Ikebe, 1939a, 1939b, 1940a, 1940b, 1940c, 1941a, 1941b.
Kanamura and Yazaki, 1940a, 1940b.
Kawasaki, 1952.
Kimura, 1935, 1941, 1942a.
LeGall, 1949.
Lozano, 1950.
Mine and Iehisa, 1940.
Moore, 1951a, 1951b.
Nakamura, Kamimura, and Yabuta, 1953.
Partlo, 1950.
Sasaki, 1939b.
Schaefer, 1948b, 1951.
Scordia, 1943.
Sella, 1952.
Uno, 1936a, 1936b.
Westman and Gilbert, 1941.
Westman and Neville, 1942.

Aku. See *Katsuwonus*.

Albacore. See *Germo*.

Allison's tuna. See *Neothunnus itosibi*.

Allothunnus

Fraser-Brunner, 1950.
Serventy, 1948.

Anatomy

Berg, 1947.
Chabanaud, 1930.
Conrad, 1937.
Eckles, 1949.
Frade, 1930a, 1930b, 1931.
Frade and DeBuen, 1932.
Godsil and Byers, 1944.
Greenhood, 1952.
Higashi, 1941b.
Imamura, 1949.
Kafuku, 1950.
LeGall, 1949.
Letaconnoux, 1950.
Nakamura, 1935, 1949.

Anatomy—Continued

Poisson and Postel, 1951.
Priol, 1944.
Rivas, 1953.
Roedel, 1948a.
Schaefer and Marr, 1948a.
Serventy, 1941a, 1942b, 1948.
Shimada, 1954.
Sueyhiro, 1936, 1938, 1941, 1942, 1950.
Uchihashi, 1953.
Yamamoto, 1933, 1934.

As food of tunas

Asano, 1939.
Marukawa, 1939b.
Suda, 1953.
Yabuta, 1953.

Atlantic Ocean

Alaejos, 1931.
Beebe, 1936.
Beebe and Tee-Van, 1936.
Bellón and Bardán de Bellón, 1949.
Bigelow and Schroeder, 1953.
Bini, 1931.
Bouxin and Legendre, 1936.
Carlson, 1951.
Chilton, 1949.
Crane, 1936.
DeBuen, 1930, 1931, 1932, 1935, 1937.
Ehrenbaum, 1934.
Farina, 1931.
Ferreira, 1932.
Frade, 1930, 1931a, 1931b, 1937.
Godsil and Holmberg, 1950.
Heldt, 1931, 1932a, 1932b.
LeDanois, 1933, 1938, 1951.
LeGall, 1934a, 1934b, 1934c, 1934d, 1949.
Legendre, 1932, 1933, 1934, 1937, 1940.
Letaconnoux, 1950.
Lozano, 1950.
Mather, 1954.
Molteno, 1948.
Morice, 1953b.
Mowbray, 1935.
Murray, 1952.
Navarro and Lozano, 1950.
Navaz, 1950.
Postel, 1949, 1950.
Priol, 1944.
Rivas, 1951, 1953.
Russell, F. S., 1934b.
Schaefer and Walford, 1950.
Schuck, 1951.
Schuck and Mather, 1951.
Schultz, 1949.
Sella, 1930.

Atlantic Ocean—Continued

Westman and Gilbert, 1941.

Westman and Neville, 1942.

Australian waters

Robins, 1952.

Serventy, 1941a, 1941b, 1942a, 1942b, 1947, 1948.

Auxis

Asano, 1939.

Barnhart, 1936.

Brock, 1949.

Chu, 1931.

DeBeaufort and Chapman, 1951.

DeBuen, 1930, 1932, 1935.

Domantay, 1940.

Fish, 1948.

Fisheries Society of Japan, 1931.

Food and Agr. Organ., U. N., 1949b.

Fowler, 1936, 1938, 1944, 1949.

Graham, 1938.

Herald, 1951.

Herre, 1940, 1943.

Herre and Umali, 1948.

Imamura, 1949.

Joubin, 1934.

LeGall, 1934a.

Marukawa, 1939b.

Mead, 1951.

Moltano, 1948.

Morice, 1953a.

Nakamura, 1939a, 1939b.

Navarro and Lozano, 1950.

Navaz, 1950.

Okada and Matsubara, 1938.

Rivas, 1951, 1953.

Sanzo, 1932.

Schaefer, 1948c, 1951.

Schaefer and Marr, 1948a.

Serventy, 1941a.

Shapiro, 1948a.

Soldatov and Lindberg, 1930.

Tanaka, 1931.

Taranetz, 1937.

Tester, 1952.

Tinker, 1944.

Tominaga, 1943.

Uchihashi, 1953.

Wade, 1949, 1951.

Walford, 1937.

Warfel, 1950.

Yabe et al., 1953.

Auxis hira

Imamura, 1949.

Nakamura, 1939b.

Okada and Matsubara, 1938.

Shapiro, 1948a.

Soldatov and Lindberg, 1930.

Tanaka, 1931.

Taranetz, 1937.

Yabe et al., 1953.

Auxis maru

Imamura, 1949.

Nakamura, 1939a, 1939b.

Soldatov and Lindberg, 1930.

Taranetz, 1937.

Auxis tapeinosoma

Okada and Matsubara, 1938.

Okada et al., 1935.

Shapiro, 1948a.

Uchihashi, 1953.

Wade, 1949.

Yabe et al., 1953.

Auxis thazard

Barnhart, 1936.

Brock, 1949.

DeBeaufort and Chapman, 1951.

DeBuen, 1930, 1932, 1935.

Domantay, 1940.

Fish, 1948.

Fisheries Society of Japan, 1931.

Food and Agr. Organ., U. N., 1949b.

Fowler, 1936, 1938, 1944, 1949.

Fraser-Brunner, 1950.

Graham, 1938.

Herald, 1951.

Herre, 1940.

Herre and Umali, 1948.

Joubin, 1934.

LeGall, 1934a.

Marukawa, 1939b.

Mead, 1951.

Moltano, 1948.

Morice, 1953a.

Navarro and Lozano, 1950.

Navaz, 1950.

Rivas, 1951.

Schaefer, 1951.

Schaefer and Marr, 1948a.

Serventy, 1941a.

Tester, 1952.

Tinker, 1944.

Wade, 1949.

Walford, 1937.

Warfel, 1950.

Baltic Sea

Rosén, 1943.

Behavior

Anonymous, 1953b.

Bigelow and Schroeder, 1953.

Hiatt and Brock, 1948.

Imamura, 1949.

Kida, 1936.

Kimura, Iwashita, and Hattori, 1952.

Lüling, 1952a.

Murphy and Niska, 1953.

Nakamura, 1949.

Russell, F. S. 1934b, 1936.

Schaefer, 1948b.

Serventy, 1942a.

Behavior—Continued

- Tanaka, 1935.
 Tester, 1952.
 Tester et al., 1952.
 Tominaga, 1943.
 Uda, 1940c.
 Uda and Tsukushi, 1934.
 Watanabe, 1941.
 Yabe and Mori, 1950.
 Yoshihara, 1951, 1952.

Bibliography

- Bini, 1952.
 Corwin, 1930.
 Heldt, 1930, 1931, 1932, 1934.
 LeGall, 1949.
 Legendre, 1934.
 Morović, 1950.
 Nakamura, 1949.
 Naváz, 1950.
 Okada and Matsubara, 1953.
 Rosa, 1950.
 Shapiro, 1948a.
 Shimada, 1951a.
 Bigeye tuna. See *Parathunnus* spp.
 Black tuna. See *Thunnus orientalis*.
 Blackfin tuna. See *Parathunnus atlanticus*.
 Bluefin tuna. See *Thunnus thynnus*.

Body condition

- Aikawa and Katō, 1938.
 Ikebe and Matsumoto, 1937.
 Kanamura and Yazaki, 1940a, 1940b.
 Kawasaki, 1952.
 Mizushima et al., 1951.
 Morice, 1953a.
 Onodera, 1941.
 Schweigger, 1949.
 South Seas Gov't., 1941c.
 Suyehiro, 1936.

Body temperature

- Kanamura and Imaizumi, 1936a.
 Kanamura and Yazaki, 1940a, 1940b.
 Nakamura, 1941.
 Ōita Pref. Fish. Expt. Sta., 1930.
 Scagel, 1949.
 Society for the Promotion . . . 1936.
 Uda, 1941.
 Watanabe, N., 1941.

Bonito. See *Katsuwonus pelamis*.

Caribbean Sea

- LeDanois, 1951.
 Rawlings, 1953.

Catch per unit of effort

- Bates, 1950.
 Chiba Pref. Fish. Expt. Sta.,
 Katsuura Br., 1938, 1941.
 Formosa Gov't.-Gen. Fish. Expt. Sta., 1933.
 Heldt, 1930, 1932.
 Hiratsuka and Imaizumi, 1934.
 Hiratsuka and Itō, 1934.

Catch per unit of effort—Continued

- Ikebe, 1940, 1941, 1942.
 Imaizumi, 1937.
 Inoue, 1953.
 Jap. Bur. Fish., 1939, 1940.
 Kanagawa Pref. Fish. Expt. Sta. 1951b.
 Kanamura and Imaizumi, 1936a.
 Kanamura and Yazaki, 1940a, 1940b.
 Kimura, 1942a.
 Marukawa, 1939c.
 Mine and Iehisa, 1940.
 Murphy and Shomura, 1953b.
 Nakamura, 1949.
 Nomura et al., 1952-3.
 Okinawa Pref. Fish. Expt. Sta., 1936b.
 Okuma et al., 1935.
 Serventy, 1947.
 Sette, 1954.
 Tester, 1952.
 Van Campen, 1952.
 Westman and Neville, 1942.
 Whitehead, 1931.
 Yabuta and Ueyanagi, 1953.

Chemical analysis

- Asaka, Noguchi, and Mimoto, 1953.
 Dontcheff and Legendre, 1938.
 Higashi and Hirai, 1948.
 Horiguchi, Kakimoto, and Kashiwada, 1950.
 Horiguchi, Kashiwada, and Kakimoto, 1953.
 Kakimoto, Kanazawa, and Kashiwada, 1953.
 Kashiwada, Kakimoto, and Horiguchi, 1952.
 Kashiwada, Kakimoto, and Yamasaki, 1953.
 Kodama, Iizuka, and Harada, 1934.
 Maldura, 1946.
 Matsui, K., 1942b.
 Migita and Arakawa, 1948.
 Miyama and Osakabe, 1938, 1940.
 Miyama, Saruya, and Hasegawa, 1939.
 Mizushima et al., 1951.
 Niwa, 1937.
 Oya and Takahashi, 1936.
 Shimizu, 1947.
 Tomiyama, T., 1933.
 Tomiyama, Y., et al., 1941.

Classification

- Berg, 1947.
 DeBuen and Frade, 1932.
 Dieuzeide, 1930.
 Frade and DeBuen, 1932.
 Fraser-Brunner, 1949, 1950.
 Godsil and Byers, 1944.
 Herre, 1953.
 Nakamura, 1939b, 1939c, 1943, 1949.
 Nichols and LaMonte, 1941.
 Okada and Matsubara, 1938.
 Roedel, 1948a.
 Serventy, 1948.
 Shapiro, 1948b.
 Soldatov and Lindberg, 1930.
 Taranetz, 1937.

Classification—Continued

- Wade, 1949.
 Walford, 1931.
 Whitehead, 1931.
 Color, water. See Oceanographic conditions.
 Common names
 Ancieta C., 1952.
 Barnhart, 1936.
 Chevey, 1932.
 DeBuen, 1930.
 Delsman and Hardenburg, 1934.
 Fish, 1948.
 Food and Agr. Organ. U. N., 1949b.
 Ikebe and Matsumoto, 1938.
 LeGall, 1949.
 Marukawa, 1939a.
 Nakamura, 1939b, 1943.
 Navaz, 1950.
 Nichols and LaMonte, 1941.
 Okada and Matsubara, 1938.
 Roedel, 1948a.
 Rosa, 1950.
 Schultz, 1949.
 Serventy, 1941a.
 Shapiro, 1948a, 1948b.
 Smith, 1947.
 Tinker, 1944.
 Tominaga, 1943.
 Walford, 1931, 1937.
 Whitley, 1947.
 Condition, body. See Body condition.
 Contents, stomach. See Food.
 Currents. See Oceanographic conditions.

Description

- Ancieta C., 1952.
 Barnard, 1948.
 Barnhart, 1936.
 Beebe and Tee-Van, 1936.
 Bigelow and Schroeder, 1953.
 Boeseman, 1947.
 Brock, 1949.
 Chabanaud, 1930.
 Chevey, 1932.
 Chilton, 1949.
 Clemens and Wilby, 1946.
 Crane, 1936.
 DeBeaufort and Chapman, 1951.
 DeBuen, 1932.
 Delsman and Hardenburg, 1934.
 Eckles, 1949.
 Fish, 1948.
 Fisheries Society of Japan, 1931.
 Fowler, 1933, 1936, 1938.
 Frade, 1931.
 Fraser-Brunner, 1950.
 Godsil and Byers, 1944.
 Graham, 1938.
 Heldt, 1931, 1932.
 Hildebrand, 1946.

Description—Continued

- Ikebe and Matsumoto, 1938.
 Imamura, 1949.
 Joubin, 1934.
 June, 1952b.
 Kanamura and Yazaki, 1940a.
 LeGall, 1934a, 1934b, 1934c, 1934d.
 Marukawa, 1939a, 1939c.
 Molteno, 1948.
 Mowbray, 1935.
 Nakamura, 1939b, 1949.
 Nichols and LaMonte, 1941.
 Okada and Matsubara, 1938.
 Okada et al., 1935.
 Poisson and Postel, 1951.
 Powell, A. W. B., 1937.
 Roedel, 1948a.
 Schaefer and Marr, 1948a, 1948b.
 Schweigger, 1943.
 Seale, 1940.
 Serventy, 1941a, 1941b, 1942b, 1948.
 Shapiro, 1948b.
 Soldatov and Lindberg, 1930.
 Tinker, 1944.
 Wade, 1949, 1950a.
 Walford, 1931, 1937.
 Whitley, 1937.
 Distribution
 Ancieta C., 1952.
 Anonymous, 1941b, 1953a, 1953b.
 Bahr, 1952.
 Barnhart, 1936.
 Bigelow and Schroeder, 1953.
 Bini, 1952.
 Brock, 1939.
 Carlson, 1951.
 Chapman, 1946.
 Chevey, 1932a, 1932b.
 Chu, 1931.
 Clemens and Wilby, 1946.
 Cowan, 1938.
 DeBuen, 1930.
 Delsman, 1933.
 Delsman and Hardenburg, 1934.
 Fish, 1948.
 Fitch, 1953.
 Food and Agr. Organ. U. N., 1949a, 1949b.
 Formosa Gov't.-Gen. Fish. Expt. Sta., 1933.
 Fowler, 1938, 1944.
 Fraser-Brunner, 1949, 1950.
 Godsil, 1949.
 Godsil and Greenhood, 1948.
 Hasegawa, 1937.
 Heldt, 1931a, 1931b, 1932.
 Herre, 1932, 1933, 1935, 1936, 1940.
 Hildebrand, 1946.
 Hiratsuka and Imaizumi, 1934.
 Hiratsuka and Itō, 1934.
 Imamura, 1949.
 Isawa, 1935.

Distribution—Continued

- Jap. Bur. Fish., 1940.
 Joubin, 1934.
 Kanamura and Yazaki, 1940a, 1940b.
 Kimura, 1941, 1942b.
 Kumata, 1941.
 LeDanois, 1933, 1938.
 LeGall, 1934b, 1934c, 1934d.
 Legerdre, 1937.
 Maldura, 1946.
 Martin, 1938.
 Mather, 1954.
 Molteno, 1948.
 Murphy and Shomura, 1953a, 1953b.
 Nakamura, 1939b, 1943, 1949, 1951.
 Navarro and Lozano, 1950.
 Okada and Matsubara, 1938.
 Okada et al., 1935.
 Okinawa Pref. Fish. Expt. Sta., 1943.
 Okuma et al., 1935.
 Powell, D., 1950.
 Powell and Hildebrand, 1950.
 Powell et al., 1952.
 Robins, 1952.
 Roedel, 1948a, 1948b.
 Rosa, 1950.
 Royce, 1953.
 Russell, F. S., 1933a, 1933b, 1934b.
 Samson, 1940.
 Schaefer, 1948c.
 Schuck and Mather, 1951.
 Schultz and DeLacy, 1936.
 Schweigger, 1943, 1949.
 Sella, 1930.
 Serventy, 1941a, 1942a, 1942b, 1948.
 Sette, 1954.
 Shapiro, 1948a, 1948b.
 Shimada, 1954.
 Smith and Schaefer, 1949.
 Soldatov and Lindberg, 1930.
 South Seas Gov't. . . . 1937a, 1937b, 1941a.
 Tanaka, 1931.
 Taranetz, 1937.
 Tinker, 1944.
 Uda, 1935a.
 Wade, 1949.
 Walford, 1937.
 Whitehead, 1930, 1931.
 Wolfe Murray, 1932.
 Yabuta and Ueyanagi, 1953.

Ecology (other than oceanographic conditions or food)

- DeBeaufort and Chapman, 1951.
 Lozano, 1950.
 Marukawa, 1939a.
 Nakamura, 1949.
 Powell, D. E., 1950.
 Powell and Hildebrand, 1950.
 Powell et al., 1952.
 Priol, 1944.

Ecology—Continued

- Uchihashi, 1953.
 Yabe and Mori, 1950.

Eggs

- DeJong, 1940.
 Delsman, 1931.
 Delsman and Hardenburg, 1934.
 Hatai et al., 1941.
 Kikawa, 1953.
 Marr, 1948.
 Nakamura, 1938.
 Sanzo, 1932, 1933.
 Watanabe, Hajime, 1939.
 Yabe and Mori, 1948.

Euthynnus

- Bigelow and Schroeder, 1953.
 Boeseman, 1947.
 Bonham, 1946.
 Brock, 1949.
 Carlson, 1951.
 Chabanaud, 1930.
 Chapman, 1946.
 Chevey, 1932a, 1932b, 1934.
 Chiba Pref. Fish. Expt. Sta., 1936.
 Chilton, 1949.
 Conrad, 1937.
 DeBeaufort and Chapman, 1951.
 DeBuen, 1930, 1935.
 DeJong, 1940.
 Delsman, 1931.
 Delsman and Hardenburg, 1934.
 Domantay, 1940.
 Dung and Royce, 1953.
 Eckles, 1949.
 Fish, 1948.
 Fisheries Society of Japan, 1931.
 Fitch, 1953.
 Food and Agri. Organ. U. N., 1949b.
 Fowler, 1931, 1938, 1944, 1949.
 Frade, 1932.
 Fraser-Brunner, 1949, 1950.
 Fukuda and Izuka, 1940.
 Godsil and Greenwood, 1948.
 Hatai et al., 1941.
 Herald, 1949.
 Herre, 1932, 1933, 1940.
 Herre and Umali, 1948.
 Hiatt and Brock, 1948.
 Higashi, 1940.
 Hildebrand, 1946.
 Imamura, 1949.
 Joubin, 1934.
 Kagoshima Pref. Fish. Expt. Sta., 1930c.
 LeGall, 1934b.
 Maldura, 1946.
 Mather, 1954.
 Mead, 1951.
 Mie Pref. Fish. Expt. Sta., 1930c, 1930e.
 Molteno, 1948.
 Morice, 1953a.

Euthynnus—Continued

- Morrow, 1954.
 Nakamura, 1939a, 1939b.
 Nigrelli and Stunkard, 1947.
 Okada and Matsubara, 1938.
 Okada et al., 1935.
 Poisson and Postel, 1951.
 Postel, 1950.
 Rivas, 1951, 1953.
 Roedel, 1948b.
 Ronquillo, 1953.
 Schaefer, 1948c, 1951.
 Schmidt, 1930.
 Schmitt and Schultz, 1940.
 Schuck, 1951.
 Seale, 1940.
 Serventy, 1941a.
 Shapiro, 1948a.
 Smith and Schaefer, 1949.
 Tanaka, 1931.
 Tester, 1952.
 Tester et al., 1952.
 Tinker, 1944.
 Tominaga, 1943.
 Tubb, 1948.
 Van Cleave, 1940.
 Wade, 1950a, 1950b, 1951.
 Walford, 1937.
 Warfel, 1950.
 Welsh, 1949a, 1949b.
 Whitley, 1937, 1947.
 Yabe, et al., 1953.
- Euthynnus affinis*. See also *E. alletteratus*.
 Dung and Royce, 1953.
 Fraser-Brunner, 1949.
- Euthynnus alleterata*. See *E. alletteratus*.
Euthynnus alleteratus. See *E. alletteratus*.
Euthynnus alletteratus
 Bigelow and Schroder, 1953.
 Boeseman, 1947.
 Carlson, 1951.
 Chabanaud, 1930.
 Chapman, 1946.
 Chilton, 1949.
 DeBeaufort and Chapman, 1951.
 DeBuen, 1930, 1935.
 DeJong, 1940.
 Delsman, 1931.
 Delsman and Hardenburg, 1934.
 Food and Agr. Organ. U. N., 1949b.
 Fowler, 1931.
 Frade, 1932.
 Herre, 1932, 1940.
 Hildebrand, 1946.
 Joubin, 1934.
 LeGall, 1934b.
 Maldura, 1946.
 Manter, 1940.
 Mather, 1954.
 Molteno, 1948.

Euthynnus alletteratus—Continued

- Morice, 1953a.
 Nigrelli and Stunkard, 1947.
 Okada and Matsubara, 1938.
 Poisson and Postel, 1951.
 Postel, 1950.
 Rivas, 1951.
 Schmidt, 1930.
 Schmitt and Schultz, 1940.
 Schuck, 1951.
 Serventy, 1941a.
 Smith and Schaefer, 1949.
 Tanaka, 1931.
 Tinker, 1944.
 Van Cleave, 1940.
 Whitley, 1937, 1947.
- Euthynnus allitteratus*. See *E. alletteratus*.
Euthynnus lineatus
 Fowler, 1938, 1944.
 Fraser-Brunner, 1949.
 Mead, 1951.
 Roedel, 1948b.
 Schaefer, 1948c, 1951.
 Seale, 1940.
 Walford, 1937.
- Euthynnus pelamis*. See *Katsuwonus*.
Euthynnus pelamys. See *Katsuwonus*.
Euthynnus vagans. See *Katsuwonus*.
Euthynnus yaito
 Bonham, 1946.
 Brock, 1949.
 Chabanaud, 1930.
 Chevey, 1932a, 1932b, 1934.
 Chiba Pref. Fish. Expt. Sta., 1936.
 Domantay, 1940.
 Eckles, 1949.
 Fisheries Society of Japan, 1931.
 Fitch, 1953.
 Fraser-Brunner, 1949.
 Fukuda and Izuka, 1940.
 Godsil and Greenhood, 1948.
 Hatai et al., 1941.
 Herald, 1949.
 Herre, 1933, 1940.
 Herre and Umali, 1948.
 Hiatt and Brock, 1948.
 Higashi, 1940.
 Imamura, 1949.
 Kagoshima Pref. Fish. Expt. Sta., 1930c.
 Mie Pref. Fish. Expt. Sta., 1930c, 1930e.
 Nakamura, 1939a, 1939b.
 Okada and Matsubara, 1938.
 Okada et al., 1935.
 Ronquillo, 1953.
 Schaefer, 1948c.
 Shapiro, 1948a.
 Tester, 1952.
 Tester et al., 1952.
 Tominaga, 1943.
 Wade, 1950a, 1950b, 1951.

Euthynnus yaito—Continued

- Warfel, 1950.
 Welsh, 1949a, 1949b.
 Whitley, 1937.
 Yabe et al., 1953.

Euthynnus alletteratus. See *Euthynnus alletteratus*.

Figures

- Anonymous, 1938.
 Barnard, 1948.
 Barnhart, 1936.
 Bigelow and Schroeder, 1953.
 Bini, 1952.
 Chevey, 1932.
 DeBuen, 1930.
 Delsman and Hardenburg, 1934.
 Eckles, 1949a, 1949b.
 Fisheries Society of Japan, 1931.
 Fowler, 1944.
 Frade, 1931.
 Fraser-Brunner, 1949, 1950.
 Godsil and Byers, 1944.
 Heldt, 1931a, 1931b, 1932b.
 Joubin, 1934.
 LeGall, 1934a, 1934b, 1934c, 1934d, 1949.
 Morice, 1953a.
 Nakamura, 1939b, 1949.
 Okada et al., 1935.
 Powell, A. W. B., 1937.
 Schaefer and Marr, 1948a, 1948b.
 Serventy, 1941a, 1942.
 Smith, 1935.
 Smith and Schaefer, 1949.
 Suyehiro, 1936, 1942.
 Tinker, 1944.
 Tominaga, 1943.
 Wade, 1949.
 Walford, 1937.
 Whitehead, 1931.

Fishing conditions correlated with area

Schweigger, 1949.

Fishing conditions correlated with season

- Clemens and Wilby, 1946.
 Kimura, 1933, 1942a.
 Kimura and Ishii, 1933.
 Lozano, 1950.
 Mine and Iehisa, 1940.
 Nakamura, 1949.
 Navaz, 1950.
 Rosén, 1943.
 Schaefer, 1952.
 Schweigger, 1949.
 Sette, 1954.
 Uda and Watanabe, 1938.
 Wade, 1950a.
 Walford, 1931.

Fishing methods and gear (other than purse seining, longlining, and livebait)

- Anonymous, 1937b, 1953b.
 Bates, 1950.

Fishing methods and gear—Continued

- Bini, 1931, 1933.
 Carlson, 1951.
 Cleaver and Shimada, 1950.
 De La Tourrasse, 1951.
 Dieuzeide, 1931.
 Domantay, 1940.
 Farina, 1931.
 Ferreira, 1932.
 Fortunić, 1930.
 Godsil, 1938.
 Heldt, 1931a, 1932.
 Hirtz, 1933.
 Imamura, 1953.
 June, 1951b.
 Kimura, Iwashita, and Hattori, 1952.
 Kreutzer, 1951a, 1951b.
 Legendre, 1936.
 Lilling, 1952a.
 Markukawa, 1939a, 1939c.
 Matsumoto, W., 1952.
 Meyer, 1951.
 Milić, 1937.
 Navarro and Lozano, 1950.
 Nishikawa, 1934.
 Postel, 1950.
 Powell, D. E., 1950.
 Powell and Hildebrand, 1950.
 Powell et al., 1952.
 Rawlings, 1953.
 Russell, F. S., 1934b.
 Schaefer, 1952, 1953.
 Schweigger, 1949.
 Scordia, 1940.
 Sella, 1931.
 Sette, 1954.
 Šoljan, 1930.
 South Seas Gov't. . . . 1937.
 Tester, 1952.
 Thiel, 1938.
 Van Campen, 1953.
 Vitlov, 1949.
 Welsh, 1949c.
 Westman and Neville, 1942.
 Yabe et al., 1953.

Food

- Anonymous, 1938.
 Asano, 1939.
 Ban, 1941.
 Beebe, 1936.
 Bouxin and Legendre, 1936.
 Carlson, 1951.
 Chapman, 1946.
 Clemens and Wilby, 1946.
 Crane, 1936.
 Delsman and Hardenburg, 1934.
 Eckles, 1949.
 Fitch, 1950.
 Formosa Gov't.-Gen. Fish. Expt. Sta., 1933.
 Hart and Hollister, 1947.

Food—Continued

Hart et al., 1948.
 Hatai et al., 1941.
 Heldt, 1934.
 Herald, 1949.
 Hildebrand, 1946.
 Imal, 1950.
 Imamura, 1949.
 Iwate Pref. Fish. Expt. Sta., 1953.
 Jap. Bur. Fish., 1933, 1934, 1935, 1939, 1940.
 Kanagawa Pref. Fish. Expt. Sta., 1951a.
 Kuronuma, 1940.
 LeGall, 1949.
 Legendre, 1932, 1933, 1934, 1940.
 Lozano, 1950.
 McHugh, 1952.
 Marukawa, 1939b, 1939c.
 Miyama et al., 1939.
 Nakamura, 1936, 1943, 1949.
 Okuma et al., 1935.
 Partlo, 1950.
 Powell, D. E., 1950.
 Powell and Hildebrand, 1950.
 Powell et al., 1952.
 Priol, 1944.
 Reintjes, 1952.
 Reintjes and King, 1953.
 Ronquillo, 1953.
 Scagel, 1949.
 Schaefers, 1952, 1953.
 Schweigger, 1949.
 Sella, 1952.
 Serventy, 1942a.
 Shapiro, 1948b.
 Suda, 1953.
 Suyehiro, 1938.
 Tominaga, 1943.
 Uda, 1940a.
 Walford, 1937.
 Watanabe, Hajime, 1939.
 Welsh, 1949a, 1949b.
 Whitley, 1937.
 Yabe et al., 1953.
 Yabe and Mori, 1948.
 Yabuta, 1953.

Germs

Aikawa, 1933.
 Aikawa and Katō, 1938.
 Alverson and Chenowith, 1951.
 Anonymous, 1938, 1953a.
 Arcidiacono, 1935.
 Asano, 1939.
 Barnhart, 1936.
 Belloc, 1935.
 Bini, 1952.
 Bouxin and Legendre, 1936.
 Brock, 1939, 1943, 1949.
 Chiba Pref. Fish. Expt. Sta., 1936a, 1936b.
 Chiba Pref. Fish. Expt. Sta.,

Germs—Continued

Katsuura Branch, 1937, 1938b,
 1941a, 1941b, 1941c, 1941d,
 1941e, 1941f.
 Clemens and Wilby, 1946.
 Conseil Int'l pour l' Exploration de la Mer, 1933.
 Cowan, 1938.
 DeBuen, 1930, 1935.
 De La Tourrasse, 1951.
 Dontcheff and Legendre, 1938.
 Dung and Royce, 1953.
 Ferreira, 1932.
 Fish, 1948.
 Fisheries Society of Japan, 1931.
 Food and Agr. Organ. U. N., 1949b.
 Fowler, 1938, 1944.
 Frade, 1953.
 Fraser-Brunner, 1950.
 Ganssle and Clemens, 1953.
 Godsil, 1945, 1948, 1949a, 1949b.
 Godsil and Byers, 1944.
 Godsil and Greenwood, 1948.
 Hart and Hollister, 1947.
 Hart et al., 1948.
 Hasegawa, 1938.
 Heldt, 1950.
 Herre, 1940.
 Herre and Umali, 1948.
 Hildebrand, 1946.
 Ikebe, 1939a, 1940.
 Inanami, 1942.
 Inoue, 1953.
 Iwate Pref. Fish. Expt. Sta., 1953.
 Jap. Bur. Fish., 1939, 1940, 1942.
 Joubin, 1934.
 Kagoshima Pref. Fish. Expt. Sta., 1930b, 1930c, 1931b,
 1932c, 1933b.
 Kanagawa Pref. Fish. Expt. Sta., 1952a, 1952b.
 Kanamura and Yazaki, 1940, 1940b.
 Kimura, 1942a, 1942b, 1949.
 Kimura, Iwashita and Hattori, 1952.
 Kuronuma, 1940.
 LeDanois, 1933, 1938, 1951.
 LeGall, 1934c, 1949.
 Legendre, 1932, 1933, 1934, 1936, 1940.
 Letaconnoux, 1950.
 Lozano, 1950.
 McHugh, 1952.
 Maldura, 1946.
 Marukawa, 1939c.
 Mie Pref. Fish. Expt. Sta., 1930c, 1930e.
 Mizushima et al., 1951.
 Molteno, 1948.
 Morice, 1953a, 1953b.
 Murphy and Shomura, 1953a, 1953b.
 Nakamura, 1939b, 1949, 1951.
 Nakamura et al., 1953.
 Nankai Reg. Fish. Res. Lab., 1951a, 1951b.
 Navarro and Lozano, 1950.
 Navaz, 1950.

Germo—Continued

- Okada and Matsubara, 1938.
 Okada et al., 1935.
 Partlo, 1950, 1951.
 Powell, D. E. 1950.
 Powell and Hildebrand, 1950.
 Powell et al., 1952.
 Priol, 1944.
 Rivas, 1951, 1953.
 Roedel, 1948a.
 Samson, 1940.
 Sanzo, 1932, 1933.
 Sasaki, 1932, 1939b.
 Scagel, 1949.
 Schaefer, 1948c.
 Schaefers, 1952, 1953.
 Schultz and DeLacy, 1936.
 Serventy, 1941a, 1941b, 1947.
 Shapiro, 1948a, 1948b.
 Shizuoka Pref. Fish. Expt. Sta. 1937b.
 Smith, 1947.
 Society for the Promotion . . . 1936, 1937a.
 Soldatov and Lindberg, 1930.
 South Seas Gov't. . . . 1943a.
 Suyehiro, 1951.
 Takayama and Ando, 1934.
 Tanaka, 1931.
 Taranetz, 1937.
 Tauchi, 1940c.
 Tinker, 1944.
 Toyama, Y., et al., 1941.
 Uda, 1931a, 1935a, 1936b, 1940b.
 Uda and Tokunaga, 1937.
 Uno, 1936a, 1936b.
 Van Campen, 1952.
 Van Campen and Shimada, 1951.
 Walford, 1931, 1937.
 Watanabe, Hajime, 1939.
 Yabuta, 1953.
 Yoshihara, 1951-52.
- Germo alalunga*. See *Germo*.
Germo albacores. See *Neothunnus itosibi*.
Germo argentivittatus. See *Neothunnus argentivittatus*.
Germo germo. See *Germo*.
Germo germon. See *Germo*.
Germo macropterus. See *Neothunnus macropterus*.
Germo obesus. See *Parathunnus atlanticus*.
Germo sibi. See *Parathunnus sibi*.
Germon. See *Germo*.
- Growth
 Aikawa and Katō, 1938.
 Brock, 1943.
 Conseil Int'l pour l' Exploration de la Mer, 1933.
 Frade, 1937a, 1937b.
 Galtsoff, 1952.
 Heldt, 1930, 1931a, 1943, 1950.
 Kamimura and Honma, 1953.
 Kimura, 1932, 1935.
 Kimura and Ishii, 1932.
 Matsui, K., 1942b.

Growth—Continued

- Moore, 1951a, 1951b.
 Nakamura, 1949.
 Nakamura et al., 1953.
 Partlo, 1950.
 Schaefer, 1948b, 1951, 1952.
 Schaefer and Walford, 1950.
 Schweigger, 1949.
 Sella, 1952.
 Sette, 1954.
 Westman and Gilbert, 1941.
 Westman and Neville, 1942.
- Gymnosarda*
 Manter, 1940.
 Nakamura, 1939a.
 Warfel, 1950.
- Gymnosarda affinis*. See *Katsuwonus*.
Gymnosarda alletterata. See *Euthynnus alletteratus*.
Gymnosarda pelamis. See *Katsuwonus*.
- Habits. See Behavior.
 Honmaguro. See *Thunnus orientalis*.
- Indian Ocean
 Molteno, 1948.
 Morrow, 1954.
 Nomura et al., 1952-53.
 Smith, 1935.
- Indonesian waters
 Anonymous, 1941b.
 Japanese Bureau of Fisheries, 1933, 1934, 1935.
 Kimura, 1942a.
 Matsubara, 1943.
 Nakamura, 1936, 1951.
 Nomura et al., 1952-53.
 Okuma et al., 1935.
 Shimada, 1937.
 South Seas Gov't. . . . 1941d.
- Juveniles. See Young.
- Katsuo. See *Katsuwonus*.
 Katsuwonidae
 Serventy, 1948.
- Katsuwonus*
 Abe, 1939.
 Aikawa, 1933, 1937.
 Aikawa and Katō, 1938.
 Anonymous, 1937a, 1937b, 1939a, 1939b, 1941b.
 Auffret, 1931.
 Bini, 1952.
 Blackburn and Rayner, 1951.
 Brock, 1949.
 Chapman, 1946.
 Chiba Pref. Fish. Expt. Sta., 1936a, 1936b.
 Chiba Pref. Fish. Expt. Sta.,
 Katsuura Branch, 1937, 1938, 1941c, 1941d.
 Cleaver and Shimada, 1950.
 Clemens and Wilby, 1946.
 DeBuen, 1930, 1935.

Katsuwonus—Continued

Delsman and Hardenburg, 1934.
 Domantay, 1940.
 Dung and Royce, 1953.
 Eckles, 1949a, 1949b.
 Fish, 1948.
 Fisheries Society of Japan, 1931.
 Food and Agr. Organ. U. N., 1949b.
 Formosa Gov't.-Gen. Fish. Expt. Sta., 1930, 1931, 1932, 1933, 1934.
 Fowler, 1931, 1934, 1938, 1944, 1949.
 Fukuda and Iizuka, 1940.
 Godsil, 1936, 1938a, 1938b, 1945, 1949.
 Godsil and Byers, 1944.
 Herald, 1951.
 Herre, 1932, 1933, 1935, 1936, 1940, 1953.
 Herre and Umali, 1948.
 Higashi, 1940a, 1940b, 1941, 1942.
 Higashi and Hirai, 1948.
 Hildebrand, 1946.
 Horiguchi, Kakimoto, and Kashiwada, 1950.
 Horiguchi, Kashiwada, and Kakimoto, 1953.
 Ikebe, 1938.
 Ikebe and Matsumoto, 1937, 1938.
 Ikeda, 1932.
 Ikeda and Andō, 1933.
 Inanami, 1942b, 1942c, 1942d.
 Joubin, 1934.
 June, 1950b, 1951b.
 Kagoshima Pref. Fish. Expt. Sta., 1930a, 1931a, 1932a, 1933a, 1934, 1935a, 1935b, 1936a, 1936b, 1936c, 1937a, 1937b, 1937c, 1938a, 1938b, 1938c, 1939a, 1939b, 1939c, 1940a, 1940b, 1940c, 1941a, 1941b.
 Kakimoto, Kanazawa, and Kashiwada, 1953.
 Kashiwada, Kakimoto, and Horiguchi, 1952.
 Kashiwada, Kakimoto, and Yamasaki, 1953.
 Kimura, 1941, 1942b, 1949.
 Kimura, Iwashita, and Hattori, 1952.
 Kodama, Iizuka, and Harada, 1934.
 Koyasu, 1931.
 Kumamoto Pref. Fish. Expt. Sta., 1946.
 Kumata et al., 1941.
 Kuronuma et al., 1949.
 LeGall, 1934d.
 Maldura, 1946.
 Manter, 1940.
 Marr, 1948.
 Martin, 1938.
 Marukawa, 1939a, 1939b.
 Mather, 1954.
 Matsui, K., 1942a, 1942b.
 Matsumoto, T., 1937.
 Matsumoto, W., 1952.
 Mie Pref. Fish. Expt. Sta., 1930a, 1930b, 1930d, 1950.
 Migita and Arakawa, 1948.
 Miura, 1941.
 Miyama and Osakabe, 1938, 1940.
 Molteno, 1948.
 Morice, 1953a.

Katsuwonus—Continued

Murayama and Ōkura, 1950, 1952.
 Murphy and Niska, 1953.
 Murphy and Shomura, 1953a, 1953b.
 Nakamura, 1935, 1939a, 1939b.
 Navarro and Lozano, 1950.
 Navaz, 1950.
 Nigrelli and Stunkard, 1947.
 Nishikawa, 1934.
 Nomura et al., 1952-53.
 Okada and Matsubara, 1938.
 Okada et al., 1935.
 Okamoto, 1940.
 Okinawa Pref. Fish. Expt. Sta., 1931, 1936a, 1940a, 1943.
 Onodera, 1941.
 Ōya and Takahashi, 1936.
 Rawlings, 1953.
 Rivas, 1951, 1953.
 Robins, 1952.
 Roedel, 1948a.
 Ronquillo, 1953.
 Sasaki, 1939a.
 Sasaki and Takehisa, 1932.
 Schaefer, 1948b, 1948c, 1951.
 Schaefer and Marr, 1948b.
 Seale, 1940.
 Serventy, 1941a, 1941b.
 Sette, 1954.
 Shapiro, 1948a, 1948b.
 Shizuoka Pref. Fish. Expt. Sta., 1936, 1937a.
 Smith and Schaefer, 1949.
 Smith, 1947.
 Soldatov and Lindberg, 1930.
 South Seas Gov't. . . . 1937a, 1937c, 1938, 1941a, 1941b, 1941c, 1942, 1943b.
 Suda, 1953.
 Suyehiro, 1936, 1938, 1941, 1942, 1950.
 Tachikawa, 1932.
 Taihoku Prov. Fish. Expt. Sta., 1932.
 Takayama, 1934.
 Tanaka, 1931.
 Taranetz, 1937.
 Tauchi, 1943.
 Tester, 1952.
 Tinker, 1944.
 Tominaga, 1943.
 Toyama, Y., et al., 1941.
 Uda, 1932b, 1933, 1935b, 1935c, 1936a, 1938, 1939, 1940a, 1940b, 1940c, 1941, 1948.
 Uda and Tsukushi, 1934.
 Van Campen, 1952.
 Wade, 1950a, 1950b, 1951.
 Walford, 1931, 1937.
 Warfel, 1950.
 Watanabe, N., 1941.
 Welsh, 1949a.
 Whitley, 1947.
 Yabe, 1953.
 Yabe and Mori, 1948, 1950.

Katsuwonus—Continued

- Yamamoto, S., 1933, 1934.
 Yamamoto, Shōkichi, 1940.
 Yamanaka, 1950.
 Yonezawa, 1950.

Katsuwonus pelamis. See *Katsuwonus*.

Keys

- Brock, 1949.
 DeBeaufort and Chapman, 1951.
 DeBuen, 1930.
 DeBuen and Frade, 1932.
 Delsman and Hardenburg, 1934.
 Frade and DeBuen, 1932.
 Fraser-Brunner, 1949, 1950.
 Godsil and Byers, 1944.
 Hildebrand, 1946.
 Mead, 1951.
 Morice, 1953a.
 Nakamura, 1949.
 Nichols and LaMonte, 1941.
 Okada and Matsubara, 1938.
 Rivas, 1951.
 Roedel, 1948a.
 Soldatov and Lindberg, 1930.
 Taranetz, 1937.
 Uda, 1933.
 Wade, 1949.
 Walford, 1931, 1937.

Kihada. See *Neothunnus macropterus*.

Kishinoella

- Brock, 1949.
 Dung and Royce, 1953.
 Fraser-Brunner, 1950.
 Nakamura, 1939a, 1939b.
 Soldatov and Lindberg, 1930.
 Whitley, 1947.

Kishinoella rara

- Brock, 1949.
 Nakamura, 1939a, 1939b.

Kishinoella tonggol

- Dung and Royce, 1953.
 Serventy, 1941a, 1942a, 1942b.
 Whitley, 1947.

Kishinoella zacalles

- Serventy, 1942b.

Kuromaguro. See *Thunnus orientalis*.

Larvae. See Young.

Laws and regulations

- Anonymous, 1952.
 Cerquetelli, 1936.
 Sugiura, 1932.

Length-weight data. See Morphometrics.

Length-weight relationship

- Anonymous, 1938.
 Bahr, 1952.
 Formosa Gov't.-Gen. Fish. Expt. Sta., 1933.
 Hiratsuka and Imaizumi, 1934a, 1934b.
 Hiratsuka and Morita, 1935, 1936.
 Ikebe, 1940b, 1940c, 1941.

Length-weight relationship—Continued

- Inanami, 1940.
 Kagoshima Pref. Fish. Expt. Sta., 1936a, 1937a,
 1938a, 1939a, 1940a, 1941a.
 Kanamura and Imaizumi, 1936a.
 Kanamura and Yazaki, 1940b.
 Kawasaki, 1952.
 Miyama et al., 1939.
 Nakamura, 1936.
 Schaefer, 1948a.
 Schweigger, 1949.
 Serventy, 1941a.
 South Seas Gov't. . . . 1941c, 1943a.
 Uno, 1936b.
 Westman and Neville, 1942.
 Yabe and Mori, 1948.
 Little tuna (tunny). See *Euthynnus alletteratus*.
- Livebait fishing
- Anonymous, 1937b.
 Chapman, 1946.
 Chiba Pref. Fish. Expt. Sta.,
 Katsuura Branch, 1941c.
 De La Tourrasse, 1951.
 Domantay, 1940a, 1940b.
 Flett, 1944.
 Higashi, 1941b.
 Ikebe and Matsumoto, 1938.
 Ikeda, 1932.
 Ikehara, 1953.
 Imamura, 1953.
 June, 1951b.
 June and Reintjes, 1953.
 Kagoshima Pref. Fish. Expt. Sta., 1935b, 1936b,
 1937c, 1938b, 1939b, 1940b, 1941a.
 Kanai and Kasu, 1938.
 Matsubara, 1943.
 Matsumoto, T., 1937.
 Miura, 1941.
 Murphy and Niska, 1953.
 Okajima, 1939.
 Powell, D. E. and Hildebrand, 1950.
 Sette, 1954.
 Shimoda, 1937.
 South Seas Gov't. . . . 1937.
 Yabe and Mori, 1950.
- Longline fishing
- Anonymous, 1937a, 1938, 1941a, 1941c.
 Chiba Pref. Fish. Expt. Sta., 1936b.
 Chiba Pref. Fish. Expt. Sta., Katsuura Branch, 1937b,
 1938b, 1941a, 1941b, 1941f.
 Ikebe, 1941a.
 Imaizumi, 1937.
 Iwate Pref. Fish. Expt. Sta., 1953a, 1953b.
 June, 1950a, 1950b.
 Kagoshima Pref. Fish. Expt. Sta., 1930b, 1930c,
 1931a, 1931b, 1932a, 1932b, 1932c, 1933b, 1935b.
 Kanagawa Pref. Fish. Expt. Sta., 1951b, 1952a,
 1952b.
 Kanamura and Imaizumi, 1936a, 1936b.
 Kanamura and Yazaki, 1940a, 1940b.

Longline fishing—Continued

- Katō, 1940.
 McKernan, 1953.
 Matsubara, 1943.
 Mie Pref. Fish. Expt. Sta., 1950.
 Miyazaki Pref. High-Seas Fish.
 Guidance Center, 1953.
 Murphy and Shomura, 1952, 1953a, 1953b.
 Nakamura, 1951.
 Nakayama, 1948.
 Nankai Reg. Fish. Res. Lab., 1951a, 1951b.
 Niska, 1953.
 Nomura et al., 1952-53.
 Okajima, 1939.
 Ōmori and Fujimoto, 1940.
 Ōmori and Fukuda, 1938, 1940.
 Powell, D. E., 1950.
 Powell et al., 1952.
 Rasalan, 1950.
 Sakai and Uno, 1940.
 Schaefers, 1952.
 Sette, 1954.
 Shapiro, 1950.
 Shimada, 1951c.
 Shimoda, 1937.
 South Seas Govt'. . . . 1937, 1942, 1943a.
 Tapiador, 1951.
 Uda, 1935a.
 Van Campen and Shimada, 1951.
 Watanabe, Haruo, 1940.
 Yoshihara, 1951-52.

Mackerel, frigate. See *Auxis* spp.

Management

- Okumura, 1943.
 Schaefer, 1948c, 1951.

Measurement data. See also Morphometrics.

- Kagoshima, 1936a, 1937a, 1938a, 1939a, 1940a, 1941a.
 Marr, 1948.
 Russell, F. S., 1934a.
 Schaefer, 1952.
 Schaefer and Walford, 1950.

Measuring methods

- LeGall, 1951.
 Marr and Schaefer, 1949.
 Priol, 1944.
 Russell, F. S., 1934a.

Mebachi. See *Parathunnus mebachi*.

Mediterranean Sea and Strait of Gibraltar

- Anonymous, 1932.
 Arcidiacono, 1935.
 Aricó and Genovese, 1953.
 Auffret, 1931.
 Bonamico, 1933.
 Cerequetelli, 1936.
 DeBuen, 1931.
 Dieuzeide, 1930.
 Farina, 1931a, 1931b.
 Frade, 1937b, 1953.
 Genovese, 1952, 1953.

Mediterranean Sea and Strait of Gibraltar—Continued

- Heldt, 1932a, 1934, 1937, 1938, 1943.
 Maldura, 1946.
 Reiss and Vellinger, 1929.
 Russell, F. S., 1934b.
 Sanzo, 1932, 1933.
 Scordia, 1930, 1939a, 1940, 1943.
 Sigma, 1941.

Meristic counts

- Conseil Int'l pour l' Exploration de la Mer, 1933.
 Godsil and Byers, 1944.
 Heldt, 1931a, 1932b.
 June, 1952a, 1952b.
 Letaconnoux, 1950.
 Marr and Schaefer, 1949.
 Schaefer and Marr, 1948a.
 Schaefer and Walford, 1950.
 Wade, 1949.

Migration

- Bini, 1952.
 DeBuen, 1931.
 Hatai et al., 1941.
 Heldt 1930, 1931a, 1932a, 1932b, 1934, 1943.
 Kagoshima Pref. Fish. Expt. Sta., 1936c.
 Kamimura and Honma, 1953.
 Kawasaki, 1952.
 Kimura, 1941, 1942b.
 LeDanois, 1938, 1951.
 Marukawa, 1939c.
 Nakamura, 1949.
 Powell, D. E., et al., 1952.
 Reiss and Vellinger, 1929.
 Rosén, 1943.
 Russell, F. S., 1936.
 Sasaki, 1939a.
 Schaefers, 1953.
 Scordia, 1940.
 Sella, 1930, 1931, 1952.
 Serventy, 1941a.
 Shapiro, 1948a, 1948b.
 Sigma, 1941.
 Tauchi, 1940b.
 Tominaga, 1943.
 Uda, 1936a.
 Uda and Tokunaga, 1937.
 Wade, 1951.
 Walford, 1937.
 Whitehead, 1931.
 Yabuta and Ueyanagi, 1953.

Miscellaneous species (*Auxis* to *Neothunnus*)

- Manter, 1940.
 Mather, 1954.
 Rivas, 1951.
 Tubb, 1948.
 Warfel, 1950.

Miscellaneous species (*Orcynus* to *Wanderer*)

- Boeseman, 1947.
 Chu, 1931.
 DeBeaufort and Chapman, 1951.
 Fowler, 1949.

Miscellaneous Species—Continued

Ginsburg, 1953.
 Rivas, 1951.
 Schaefer, 1951.
 Schaefer, 1952, 1953.
 Sella, 1931.

Morphometrics

Aikawa and Kato, 1938.
 Aricó and Genovese, 1953.
 Bellón and Bardán de Bellón, 1949.
 Bini, 1931.
 Bonham, 1946.
 Conseil Int'l pour l' Exploration de la Mer, 1933.
 DeBuen, 1932.
 Dung and Royce, 1953.
 Frade, 1931a, 1931b.
 Godsil, 1948, 1949.
 Godsil and Byers, 1944.
 Greenwood, 1952.
 Heldt, 1937, 1938.
 Higashi, 1942.
 Hiratsuka and Morita, 1935, 1936.
 Ikebe and Matsumoto, 1937.
 Inanami, 1942d.
 Jap. Bur. Fish., 1939, 1940.
 June, 1952a, 1952b.
 LeGall, 1949, 1951.
 Legendre, 1934.
 Letaconnoux, 1950.
 Marr and Schaefer, 1949.
 Mather, 1954.
 Nakamura, 1939b, 1939c.
 Navaz, 1950.
 Oita Pref. Fish. Expt. Sta., 1930.
 Priol, 1944.
 Royce, 1953.
 Russell, F. S., 1934a.
 Schaefer, 1948a, 1951, 1952.
 Schaefer and Walford, 1950.
 Serventy, 1948.
 Uda, 1941.
 Watanabe, Hajime, 1939.
 Yabe et al., 1953.

Neothunnus (Neothynnus)

Abe, 1939.
 Aikawa, 1933.
 Aikawa and Katō, 1938.
 Ancieta C., 1952.
 Arai and Matsumoto, 1953.
 Ban, 1941.
 Barnard, 1948.
 Barnhart, 1936.
 Bates, 1950.
 Beebe, 1936.
 Beebe and Tee-Van, 1936.
 Bini, 1931, 1952.
 Boeseman, 1947.
 Bonham, 1946.
 Brock, 1949.

Neothunnus (Neothynnus)—Continued

Chapman, 1946.
 Chiba Pref. Fish. Expt. Sta., 1936b.
 Chiba Pref. Fish. Expt. Sta.,
 Katsuura Branch, 1941f.
 Chu, 1931.
 Copley, 1947.
 DeBeaufort and Chapman, 1951.
 DeBuen, 1930, 1935.
 Delsman and Hardenburg, 1934.
 Domantay, 1940.
 Dung and Royce, 1953.
 Eckles, 1949a.
 Fish, 1948.
 Fisheries Society of Japan, 1931.
 Fitch, 1950.
 Food and Agr. Organ. U. N., 1949b.
 Formosa Gov't.-Gen. Fish. Expt. Sta., 1933a, 1933b.
 Fowier, 1931, 1936, 1949.
 Frade, 1931b, 1931c.
 Ginsburg, 1953.
 Godsil, 1936, 1938a, 1938b, 1945, 1948, 1949a, 1949b.
 Godsil and Byers, 1944.
 Godsil and Greenwood, 1948, 1951, 1952.
 Greenwood, 1952.
 Hatai et al., 1941.
 Herald, 1949.
 Herre, 1932, 1935, 1936, 1940.
 Herre and Umali, 1948.
 Higashi, 1940, 1941, 1942.
 Higashi and Hirai, 1948.
 Hildebrand, 1946.
 Hiratsuka and Imaizumi, 1934.
 Hiratsuka and Itō, 1934.
 Hiratsuka and Morita, 1935, 1936.
 Ikebe, 1939a, 1939b, 1940a, 1940b, 1940c, 1940d,
 1941b, 1941c, 1942.
 Inanami, 1940a, 1940b, 1940c, 1942a, 1942b.
 Iwate Pref. Fish. Expt. Sta., 1953a, 1953b.
 Jap. Bur. Fish., 1933, 1934, 1935.
 June, 1952b, 1953.
 Kagoshima Pref. Fish. Expt. Sta., 1930b, 1930c,
 1931b, 1933b.
 Kanamura and Imaizumi, 1936a.
 Kanamura and Yazaki, 1940a, 1940b.
 Katō, 1940.
 Kawamura, 1939.
 Kimura, 1932, 1935, 1942a, 1942b.
 Kimura and Ishii, 1932, 1933b.
 Kumata et al., 1941.
 Marr, 1948.
 Martin, 1938.
 Marukawa, 1939b, 1939c.
 Mather, 1954.
 Mead, 1951.
 Mie Pref. Fish. Expt. Sta., 1930c, 1930e.
 Migita and Arakawa, 1948.
 Miura, 1941.
 Miyama and Osakabe, 1940.
 Miyama et al., 1939.

Neothynnus (Neothynnus)—Continued
 Miyazaki Pref., High-Seas Fish. Guidance Center, 1953.
 Molteno, 1948.
 Moore, 1951a, 1951b.
 Morice, 1953a, 1953b.
 Morrow, 1954.
 Murphy and Niska, 1953.
 Murphy and Shomura, 1953a, 1953b.
 Nakamura, 1936, 1939a, 1939b, 1939c, 1941, 1943, 1949, 1951.
 Nankai Reg. Fish. Res. Lab., 1951a.
 Nichols and LaMonte, 1941.
 Nigrelli and Stunkard, 1947.
 Nomura et al., 1952-53.
 Ōita Pref. Fish. Expt. Sta., 1930.
 Okada and Matsubara, 1938.
 Okada et al., 1935.
 Okinawa Pref. Fish. Expt. Sta., 1936b.
 Ōkuma et al., 1935.
 Phillipps, 1932.
 Powell, A. W. B., 1937.
 Rawlings, 1953.
 Reintjes, 1952.
 Reintjes and King, 1953.
 Rivas, 1951, 1953.
 Roedel, 1948a.
 Ronquillo, 1953.
 Royce, 1953.
 Schaefer, 1948a, 1948b, 1948c, 1951, 1952.
 Schaefer and Marr, 1948b.
 Schaefer and Walford, 1950.
 Schweigger, 1943, 1949.
 Seale, 1940.
 Serventy, 1941a, 1941b.
 Sette, 1954.
 Shapiro, 1948, 1948b.
 Shimada, 1951, 1954.
 Smith and Schaefer, 1949.
 Smith, 1947.
 Soldatov and Lindberg, 1930.
 South Seas Gov't. . . . 1937a, 1938, 1941a, 1941d, 1942, 1943a, 1943b.
 Suda, 1953.
 Suyehiro, 1941, 1942.
 Tanaka, 1931.
 Tapiador, 1951.
 Taranetz, 1937.
 Tauchi, 1940b.
 Tester, 1952.
 Tester et al., 1952.
 Tinker, 1944.
 Toyama, Y., et al., 1941.
 Uda, 1935a, 1952.
 Uehara, 1941.
 Van Campen, 1952.
 Wade, 1950a, 1950b, 1951.
 Walford, 1931, 1937.
 Warfel, 1950.
 Watanabe, Haruo, 1940.

Neothynnus (Neothynnus)—Continued
 Welsh, 1949a, 1949c.
 Whitley, 1947.
 Yabe et al., 1953.
 Yabe and Mori, 1950.
 Yabuta, 1953.
 Yabuta and Ueyanagi, 1953a, 1953b.
Neothynnus albacora
 Barnard, 1948.
 Bini, 1931.
 DeBuen, 1930, 1935.
 Frade, 1931b, 1931c.
 Marukawa, 1939c.
 Navarro and Lozano, 1950.
 Nichols and LaMonte, 1941.
 Schaefer and Walford, 1950.
Neothynnus albacares. See *N. macropterus*.
N. albacora albacora. See *N. macropterus*.
N. albacora macropterus. See *N. macropterus*.
N. allisoni
 Nichols and LaMonte, 1941.
 Walford, 1937.
N. allisoni allisoni. See *N. allisoni*.
N. allisoni itosibi. See *N. itosibi*.
N. argentivitattus
 Beebe, 1936.
 Beebe and Tee-Van, 1936.
 Fowler, 1944.
 Rawlings, 1953.
N. catalinae
 Nichols and LaMonte, 1941.
N. itosibi
 Domantay, 1940b.
 Martín, 1938.
 Molteno, 1948.
 Nakamura, 1939c.
 Okada and Matsubara, 1938.
 Phillipps, 1932.
 Powell, A. W. B., 1937.
N. macropterus
 Abe, 1939.
 Aikawa, 1933.
 Aikawa and Katō, 1938.
 Ancieta C., 1952.
 Anonymous, 1938.
 Arai and Matsumoto, 1953.
 Asakawa, Noguchi, and Mimoto, 1953.
 Ban, 1941.
 Barnhart, 1936.
 Bates, 1950.
 Bini, 1952.
 Boeseman, 1947.
 Bonham, 1946.
 Brock, 1949.
 Chapman, 1946.
 Chiba Pref. Fish. Expt. Sta., 1936b.
 Chiba Pref. Fish. Expt. Sta., Katsuura Branch, 1941.
 Chu, 1931.
 Copley, 1947.

N. macropterus—Continued

- DeBeaufort and Chapman, 1951.
 DeBuen, 1935.
 Delsman and Hardenburg, 1934.
 Domantay, 1940.
 Dung and Royce, 1953.
 Eckles, 1949a.
 Fish, 1948.
 Fisheries Society of Japan, 1931.
 Fitch, 1950.
 Food and Agr. Organ. U. N., 1949b.
 Formosa Gov't.—Gen. Fish. Expt. Sta., 1933a.
 Fowler, 1931, 1936, 1949.
 Ginsburg, 1953.
 Godsil, 1936, 1938a, 1938b, 1945, 1948, 1949a, 1949b.
 Godsil and Byers, 1944.
 Godsil and Greenwood, 1948, 1951, 1952.
 Greenwood, 1952.
 Hatai et al., 1941.
 Herald, 1949.
 Herre, 1932, 1935, 1936, 1940.
 Herre and Umali, 1948.
 Higashi, 1940a, 1941a, 1941b, 1942.
 Higashi and Hirai, 1948.
 Hildebrand, 1946.
 Hiratsuka and Imaizumi, 1934.
 Hiratsuka and Itô, 1934.
 Hiratsuka and Morita, 1935, 1936.
 Ikebe, 1939a, 1939b, 1940a, 1940b, 1940d, 1941b,
 1941c, 1942.
 Ikehara, 1953.
 Imaizumi, 1937.
 Inanami, 1940a, 1940b, 1940c, 1942a, 1942b.
 Iwate Pref. Fish. Expt. Sta., 1953a, 1953b.
 Jap. Bur. Fish., 1933, 1934, 1935.
 June, 1952b, 1953.
 Kagoshima Pref. Fish. Expt. Sta., 1930b, 1930c,
 1931b, 1933b.
 Kanagawa Pref. Fish. Expt. Sta. 1951a.
 Kanamura and Imaizumi, 1936a.
 Kanamura and Yazaki, 1940a, 1940b.
 Katô, 1940.
 Kawamura, 1939.
 Kimura, 1932, 1935, 1942a, 1942b.
 Kimura and Ishii, 1932, 1933b.
 Kumata et al., 1941.
 Marr, 1948.
 Martin, 1938.
 Marukawa, 1939b.
 Mather, 1954.
 Mead, 1951.
 Mie Pref. Fish. Expt. Sta., 1930c, 1930d, 1930e.
 Migita and Arakawa, 1948.
 Miura, 1941.
 Miyama and Osakabe, 1940.
 Miyama et al., 1939.
 Miyazaki Pref. High-Seas Fish. Guidance Center,
 1953.
 Moore, 1951a, 1951b.
 Morrow, 1954.

N. macropterus—Continued

- Murphy and Niska, 1953.
 Murphy and Shomura, 1952, 1953a, 1953b.
 Nakamura, 1936, 1939a, 1939b, 1939c, 1941, 1943,
 1949, 1951.
 Nigrelli and Stunkard, 1947.
 Nomura et al., 1952-53.
 Oita Pref. Fish. Expt. Sta., 1930.
 Okada and Matsubara, 1938.
 Okada et al., 1935.
 Okinawa Pref. Fish. Expt. Sta., 1936b.
 Ôkuma et al., 1935.
 Reintjes, 1952.
 Reintjes and King, 1953.
 Roedel, 1948a.
 Ronquillo, 1953.
 Royce, 1953.
 Schaefer, 1948a, 1948b, 1948c, 1951, 1952.
 Schaefer and Marr, 1948b.
 Schaefer and Walford, 1950.
 Schweigger, 1943, 1949.
 Seale, 1940.
 Serventy, 1941a, 1941b.
 Sette, 1954.
 Shapiro, 1948a, 1948b.
 Shimada, 1951b, 1954.
 Smith and Schaefer, 1949.
 Smith, 1947.
 Soldatov and Lindberg, 1930.
 South Seas Gov't. . . . 1937a, 1938, 1941a, 1941d,
 1942, 1943a, 1943b.
 Suda, 1953.
 Suyehiro, 1941, 1942.
 Takayama and Andô, 1934.
 Tanaka, 1931.
 Tapiador, 1951.
 Taranetz, 1937.
 Tauchi, 1940b.
 Tester, 1952.
 Tester et al., 1952.
 Tinker, 1944.
 Toyama, Y., et al., 1941.
 Uda, 1952.
 Uehara, 1941.
 Van Campen, 1952.
 Wade, 1950a, 1950b, 1951.
 Walford, 1931, 1937.
 Warfel, 1950.
 Watanabe, Haruo, 1940.
 Welsh, 1949a, 1949c.
 Whitley, 1947.
 Yabe et al., 1953.
 Yabe and Mori, 1950.
 Yabuta, 1953.
 Yabuta and Ueyanagi, 1953a, 1953b.
- N. rarus*
 Delsman and Hardenburg, 1934.
 Herre, 1940.
 Nakamura, 1943, 1949.
 Nichols and LaMonte, 1941.

N. rarus—Continued

- Serventy, 1942b.
N. rarus zacalles. See *Kishinoella zacalles*.
 North Sea and English Channel
 Bahr, 1952.
 Delsman, 1933.
 Fick, 1937.
 Kreutzer, 1951a.
 Lüling, 1950, 1951, 1952b.
 Rosén, 1943.
 Russell, F. S., 1933a, 1934a.
- Oceanographic conditions correlated with fishing or distribution
 Aikawa, 1933.
 Anonymous, 1937a, 1941c, 1942.
 Ban, 1941.
 Bini, 1952.
 Chiba Pref. Fish. Expt. Sta., 1936a.
 Chiba Pref. Fish. Expt. Sta.,
 Katsuura Branch, 1937a, 1937b, 1938a, 1938b,
 1941a, 1941b, 1941c, 1941d, 1941f.
 Formosa Gov't.-Gen. Fish. Expt. Sta., 1930, 1931,
 1932, 1933a, 1933b, 1934.
 Fujii, 1932.
 Fukuda and Iizuka, 1940.
 Genovese, 1952, 1953.
 Hart and Hollister, 1947.
 Hiratsuka and Imaizumi, 1934.
 Hiratsuka and Itô, 1934.
 Iehisa, 1939.
 Ikebe, 1940b, 1941a, 1942.
 Ikebe and Matsumoto, 1937.
 Imamura, 1949.
 Inanami, 1938, 1940b, 1940c, 1941, 1942a, 1942b.
 Inoue, 1953.
 Jap. Bur. Fish. 1933, 1934, 1935, 1939, 1940.
 Kagoshima Pref. Fish. Expt. Sta., 1930a, 1930b,
 1930c, 1931a, 1931b, 1932a, 1932c, 1933a, 1933b,
 1934, 1935a, 1936a, 1937a.
 Kanagawa Pref. Fish. Expt. Sta., 1951a, 1951b,
 1952a, 1952b.
 Kanamura and Imaizumi, 1936a.
 Kawamura, 1939.
 Kawana, 1934, 1937.
 Kawasaki, 1952.
 Kida, 1936.
 Kimura, 1941, 1942a, 1949.
 Kimura and Ishii, 1933b.
 Kumamoto Pref. Fish. Expt. Sta., 1946.
 LeDanois, 1933, 1938.
 Matsubara, 1943.
 Matsumoto, T., 1937.
 Mie Pref. Fish. Expt. Sta., 1930a, 1930b, 1930c,
 1930d, 1930e.
 Miyazaki Pref. High-Seas Fish.
 Guidance Center, 1953.
 Murphy and Niska, 1953.
 Murphy and Shomura, 1953a, 1953b.
 Nakamura, 1949.
 Ōita Pref. Fish. Expt. Sta., 1930.

Oceanographic conditions—Continued

- Okinawa Pref. Fish. Expt. Sta., 1940a, 1940b, 1943.
 Ōkuma, 1935.
 Ōmori and Fujimoto, 1940.
 Ōmori and Fukuda, 1940.
 Partlo, 1950, 1951.
 Powell, D. E. 1950.
 Powell and Hildebrand, 1950.
 Powell et al., 1952.
 Reiss and Vellinger, 1929.
 Saitō, 1937.
 Sasaki, 1932, 1939a, 1939b.
 Scagel, 1949.
 Schaeffers, 1952, 1953.
 Shapiro, 1948b.
 Shizuoka Pref. Fish. Expt. Sta., 1936, 1937a.
 Society for the Promotion . . . 1936.
 South Seas Government . . . 1937c, 1938, 1941d
 1942, 1943a, 1943b.
 Taihoku Prov. Fish. Expt. Sta., 1932.
 Takayama and Andō, 1934.
 Takayama et al., 1934.
 Tapiador, 1951.
 Uda, 1931a, 1933, 1935a, 1935b, 1935c, 1936a,
 1936b, 1938, 1939, 1940a, 1940b, 1941, 1948, 1952.
 Uda and Tokunaga, 1937.
 Uehara, 1941.
 Yabe et al., 1953.
 Yabuta, 1953.
 Yabuta and Ueyanagi, 1953a, 1953b.
- Orcynus*
 Priol, 1944.
 Sanzo, 1932, 1933.
Orcynus alalonga. See *Germo*.
Orcynus germo. See *Germo*.
Orcynus pacificus. See *Germo*.
Orcynus thynnus. See *Thunnus thynnus*.
- Pacific Ocean, NE
 Barnhart, 1936.
 Bates, 1950.
 Brock, 1938, 1939, 1943, 1949, 1954.
 Chapman, 1946.
 Chiba Pref. Fish. Expt. Sta.,
 Katsuura Branch, 1941e, 1941f.
 Clemens and Wilby, 1946.
 Cowan, 1938.
 Eckles, 1949a, 1949b.
 Fish, 1948.
 Fitch, 1950, 1953.
 Godsil, 1936, 1937, 1938a, 1938b, 1938c.
 Godsil and Greenwood, 1948, 1951, 1952.
 Godsil and Holmberg, 1950.
 Hart and Hollister, 1947.
 Hart et al., 1948.
 Ikehara, 1953.
 Inanami, 1941.
 June, 1950a, 1953.
 McHugh, 1952.
 McKernan, 1953.
 Matsui, Y., 1938.

Pacific Ocean, NE—Continued

- Moore, 1951a, 1951b.
 Murphy and Niska, 1953.
 Murphy and Shomura, 1953a, 1953b.
 Nakamura et al., 1953.
 Niska, 1953.
 Partlo, 1950, 1951.
 Powell, D. E., 1950.
 Powell and Hildebrand, 1950.
 Powell et al., 1952.
 Reintjes and King, 1953.
 Roedel, 1948a, 1948b.
 Samson, 1940.
 Schaefer, 1948a, 1948b, 1952.
 Schaefer and Marr, 1948a, 1948b.
 Schaefer and Walford, 1950.
 Schaefers, 1952, 1953.
 Schultz and DeLacy, 1936.
 Sette, 1954.
 Smith and Schaefer, 1949.
 South Seas Gov't. . . . 1943a.
 Tester, 1952.
 Tinker, 1944.
 Van Campen and Shimada, 1951.
 Walford, 1931, 1937.
 Welsh, 1949a, 1949b, 1949c.
 Whitehead, 1930, 1931.
- Pacific Ocean, NW
 Abe, 1939.
 Aikawa, 1932, 1933, 1937.
 Anonymous, 1939, 1941b, 1941c.
 Boeseman, 1947.
 Chapman, 1946.
 Chevey, 1932a, 1934.
 Chiba Pref. Fish. Expt. Sta., 1936a, 1936b.
 Chiba Pref. Fish. Expt. Sta.,
 Katsuura Branch, 1937a, 1937b, 1938a, 1938b,
 1941a, 1941b, 1941d, 1941e.
 Cleaver and Shimada, 1950.
 DeJong, 1940.
 Delsman, 1931.
 Domantay, 1940a, 1940b.
 Ego and Otsu, 1952.
 Espenshade, 1948.
 Fish, 1948.
 Fisheries Society of Japan, 1931.
 Formosa Gov't.-Gen. Fish. Expt. Sta., 1930, 1931,
 1932, 1933a, 1933b, 1934.
 Fujii, 1932.
 Fukuda and Iizuka, 1940a, 1940b.
 Hasegawa, Kiichi, 1937.
 Hasegawa, Kimpel, 1938.
 Hatai et al., 1941.
 Herre, 1933, 1935.
 Herre and Umali, 1948.
 Hiatt and Brock, 1948.
 Hiratsuka and Itô, 1934.
 Hiratsuka and Morita, 1935, 1936.
 Iehisa, 1939.
 Ikebe, 1938, 1939a, 1939b, 1940a, 1940b, 1940c,

Pacific Ocean, NE—Continued

- 1940d, 1941c.
 Ikebe and Matsumoto, 1937a.
 Ikeda, 1932.
 Ikeda and Andô, 1933.
 Imamura, 1949.
 Inanami, 1940a, 1940b, 1942a, 1942b, 1942c, 1942d.
 Jap. Bur. Fish. 1933, 1934, 1935, 1940, 1942.
 June, 1951b, 1952a, 1952b.
 Kagoshima Pref. Fish. Expt. Sta., 1930a, 1930b,
 1930c, 1931a, 1932a, 1932c, 1933a, 1933b, 1934,
 1935a, 1935b, 1936b, 1937a, 1937b, 1937c, 1938a,
 1938b, 1938c, 1939a, 1939b, 1939c, 1940a, 1940b,
 1940c, 1941a, 1941b.
 Kanagawa Pref. Fish. Expt. Sta., 1951a, 1951b,
 1952a, 1952b.
 Kanai, Moto and Kasu, 1938.
 Kanamura and Imaizumi, 1936a, 1936b.
 Kanamura and Yazaki, 1940b.
 Katô, 1940.
 Kawamura, 1939.
 Kawana, 1934, 1935, 1938.
 Kida, 1936.
 Kikawa, 1953.
 Kimura, 1933, 1935, 1941, 1942a, 1942b, 1949.
 Kimura and Ishii, 1931, 1932, 1933b.
 Koyasu, 1931.
 Kumamoto Pref. Fish. Expt. Sta., 1946.
 McKernan, 1953.
 Manter, 1940.
 Matsubara, 1943.
 Matsui, K., 1942b.
 Mie Pref. Fish. Expt. Sta., 1930a, 1930b, 1930c,
 1930d, 1930e, 1950a, 1950b, 1950c.
 Mine and Iehisa, 1940.
 Miura, 1941.
 Murayama and Ôkura, 1950, 1952.
 Nakamura, 1938, 1939b, 1939c, 1941, 1943,
 1949, 1951.
 Nakamura, et al., 1953.
 Nankai Reg. Fish. Res. Lab., 1951a, 1951b.
 Noguchi, 1938.
 Nomura et al., 1952-53.
 Ôita Pref. Fish. Expt. Sta., 1930.
 Okada and Matsubara, 1938.
 Okajima, 1939.
 Okamoto, 1940.
 Okinawa Pref. Fish. Expt. Sta., 1931, 1936a,
 1940a, 1940b.
 Ôkuma et al., 1935.
 Ômori and Fujimoto, 1940.
 Ômori and Fukuda, 1933, 1940.
 Onodera, 1941.
 Rasalan, 1950.
 Ronquillo, 1953.
 Sakai and Uno, 1940.
 Sasaki, 1932, 1939a, 1939b.
 Sasaki, and Takehisa, 1932.
 Scagel, 1949.
 Schmidt, 1930.

Pacific Ocean, NW—Continued

- Shapiro, 1948a, 1948b.
 Shimada, 1951b, 1951c.
 Shizuoka Pref. Fish. Expt. Sta., 1936, 1937a, 1937b.
 Smith and Schaefer, 1949.
 Smith, 1947.
 Society for the Promotion . . . 1936, 1937a.
 Soldatov and Lindberg, 1930.
 South Seas Gov't. . . 1937a, 1937b, 1937c, 1937d,
 1938, 1941a, 1941b, 1941c, 1941d, 1942, 1943a,
 1943b.
 Suda, 1953.
 Sugiura, 1932.
 Tachikawa, 1932.
 Taihoku Prov. Fish. Expt. Sta., 1932.
 Takayama and Andō, 1934.
 Takayama et al., 1934.
 Tanaka, 1931, 1936, 1939.
 Tapiador, 1951.
 Taranetz, 1937.
 Tauchi, 1940a, 1940b, 1940c, 1943.
 Tominaga, 1943.
 Uda, 1931a, 1931b, 1932a, 1933, 1935a, 1935b,
 1935c, 1936a, 1938, 1939, 1940b, 1940c, 1941,
 1948, 1952.
 Uda and Tokunaga, 1937.
 Uda and Tsukushi, 1934.
 Uehara, 1941.
 Uno, 1936a.
 Van Campen and Shimada, 1951.
 Wade, 1950a.
 Warfel, 1950.
 Watanabe, Hajime, 1939.
 Watanabe, Haruo, 1940.
 Watanabe, Nobuo, 1941.
 Yabe, 1953.
 Yabe et al., 1953.
 Yabe and Mori, 1950.
 Yabuta, 1953.
 Yabuta and Ueyanagi, 1953a.
 Yamamoto, Shōkichi, 1940.

Pacific Ocean, SE

- Ancieta C., 1952.
 Bini, 1952.
 Chapman, 1946.
 Fish, 1948.
 Fowler, 1938.
 Schweigger, 1943, 1949.
 Seale, 1940.
 Shimada, 1951d, 1954.
 Van Campen, 1953.

Pacific Ocean, SW

- Anonymous, 1953a.
 Ban, 1941.
 Chapman, 1946.
 Fish, 1948.
 Flett, 1944.
 Formosa Gov't. Gen. Fish. Expt. Sta., 1933.
 Fowler, 1938.
 Godsil and Holmberg, 1950.

Pacific Ocean SW—Continued

- Ikebe, 1941b.
 McKernan, 1953.
 Nomura et al., 1952-53.
 Phillipps, 1932.
 Robins, 1952.
 Saitō, 1937.
 Serventy, 1941a, 1941b, 1942a, 1942b, 1947, 1948.
 Whitley, 1937, 1947.

Parasites

- Arai and Matsumoto, 1953.
 Crane, 1936.
 LeGall, 1949.
 Legendre, 1940.
 Manter, 1940.
 Nigrelli and Stunkard, 1947.
 Priol, 1944.
 Van Cleave, 1940.

Parathynnus (Parathynnus)

- Aikawa, 1933.
 Asakawa, Noguchi, and Mimoto, 1953.
 Beebe, 1936.
 Beebe and Tee-Van, 1936.
 Bellón and Bardán de Bellón, 1949.
 Bini, 1931.
 Brock, 1949.
 Chiba Pref. Fish. Expt. Sta., 1936b.
 Chiba Pref. Fish. Expt. Sta.,
 Katsuura Branch, 1941e, 1941f.
 DeBeaufort and Chapman, 1951.
 DeBuen, 1930.
 Domantay, 1940b.
 Dung and Royce, 1953.
 Fish, 1948.
 Fisheries Society of Japan, 1931.
 Fowler, 1931, 1938, 1949.
 Frade, 1931b.
 Fukuda and Iizuka, 1940.
 Godsil, 1945.
 Godsil and Byers, 1944.
 Hatai et al., 1941.
 Herre, 1940.
 Higashi, 1940a, 1941b.
 Ikebe, 1939a, 1940a, 1942.
 Inanami, 1940b, 1940c.
 Iwate Pref. Fish. Expt. Sta., 1953a, 1953b.
 Jap. Bur. Fish., 1933, 1934, 1939.
 Kagoshima Pref. Fish. Expt. Sta., 1930b, 1930c,
 1931b, 1933b.
 Kamimura and Honma, 1953.
 Kanagawa Pref. Fish. Expt. Sta., 1951a, 1952a,
 1952b.
 Kanamura and Imaizumi, 1936a.
 Kanamura and Yazaki, 1940a.
 Kikawa, 1953.
 Kimura, 1942a, 1942b.
 Kimura, Iwashita, and Hattori, 1952.
 Kumata et al., 1941.
 Mie Pref. Fish. Expt. Sta., 1930c, 1930e.
 Miyama and Osakabe, 1938, 1940.

Parathunnus (Parathynnus)—Continued

- Miyazaki Pref. High-Seas Fish.,
Guidance Center, 1953.
Molteno, 1948.
Morice, 1953b.
Mowbray, 1935.
Murphy and Shomura, 1953a, 1953b.
Nakamura, 1939a, 1939b, 1941, 1943, 1949, 1951,
1953.
Nankai Reg. Fish. Res. Lab., 1951a.
Navarro and Lozano, 1950.
Nomura et al., 1952-53.
Ōita Pref. Fish. Expt. Sta., 1930.
Okada and Matsubara, 1938.
Okada et al., 1935.
Okinawa Pref. Fish. Expt. Sta., 1940b.
Ōmori and Fujimoto, 1940.
Ōmori and Fukuda, 1938, 1940.
Rivas, 1953.
Roedel, 1948a.
Schaefer, 1951.
Schuck and Mather, 1951.
Shapiro, 1948a.
Shimada, 1951b, 1954.
Smith and Schaefer, 1949.
Soldatov and Lindberg, 1930.
South Seas Government . . . 1941a, 1942.
Suda, 1953.
Suyehiro, 1941, 1942.
Takayama and Andō, 1934.
Toyama, Y., et al., 1941.
Uda, 1935a.
Uehara, 1941.
Van Campen, 1952.
Watanabe, Haruo, 1940.
Yabuta, 1953.
Yabuta and Ueyanagi, 1953a.
- Parathunnus atlanticus*
Beebe, 1936.
Beebe and Tee-Van, 1936.
Bellón and Bardán de Bellón, 1949.
Bini, 1931.
DeBuen, 1930.
Frade, 1931b.
Legendre, 1937.
Marukawa, 1939b, 1939c.
Mather, 1954.
Molteno, 1948.
Morice, 1953b.
Mowbray, 1935.
Navarro and Lozano, 1950.
Nigrelli and Stunkard, 1947.
Rawlings, 1953.
Schuck and Mather, 1951.
- Parathunnus mebachi*
Asakawa, Noguchi, and Mimoto, 1953.
Fish, 1948.
Godsil, 1945.
Godsil and Byers, 1944.
Ikebe, 1939a.
Kamimura and Honma, 1953.

Parathunnus (Parathynnus)—Continued

- Kikawa, 1953.
Kumata et al., 1941.
Mie Pref. Fish. Expt. Sta., 1930a, 1930d.
Nakamura, 1939a, 1939b, 1943, 1949.
Nakamura et al., 1953.
Roedel, 1948a.
South Seas Government . . . 1941a.
Takayama and Andō, 1934.
- Parathunnus obesus*. See *P. atlanticus*.
- Parathunnus sibi*
Aikawa, 1933.
Brock, 1949.
Chiba Pref. Fish. Expt. Sta., 1936b.
Chiba Pref. Expt. Sta.,
Katsuura Branch, 1941e, 1941f.
DeBeaufort and Chapman, 1951.
Domantay, 1940b.
Dung and Royce, 1953.
Fisheries Society of Japan, 1931.
Fowler, 1931, 1938, 1949.
Fukuda and Izuka, 1940a.
Hatai et al., 1941.
Herre, 1940.
Higashi, 1940a, 1941b.
Ikebe, 1940a, 1942.
Inanami, 1940b, 1940c.
Iwate Pref. Fish. Expt. Sta., 1953a, 1953b.
Jap. Bur. Fish., 1934, 1935, 1939.
Kagoshima Pref. Fish. Expt. Sta., 1930b, 1930c,
1931b, 1933b.
Kanagawa Pref. Fish. Expt. Sta.,
1951a, 1952a, 1952b.
Kanamura and Imaizumi, 1936a.
Kanamura and Yazaki, 1940a.
Kimura, 1942a, 1942b.
Kimura, Iwashita, and Hattori, 1952.
Kumata et al., 1941.
Marukawa, 1939b.
Mie Pref. Fish. Expt. Sta., 1930c, 1930e.
Miyama and Osakabe, 1938, 1940.
Miyazaki Pref. High-Seas Fish.
Guidance Center, 1953.
Murphy and Shomura, 1953a, 1953b.
Nakamura, 1941, 1951.
Nankai Reg. Fish. Res. Lab. 1951a.
Nomura et al., 1952-53.
Ōita Pref. Fish. Expt. Sta., 1930.
Okada and Matsubara, 1938.
Okada et al., 1935.
Okinawa Pref. Fish. Expt. Sta., 1940b.
Ōmori and Fujimoto, 1940.
Ōmori and Fukuda, 1938, 1940.
Schaefer, 1951.
Shapiro, 1948a.
Shimada, 1951b, 1954.
Smith and Schaefer, 1949.
South Seas Gov't. . . 1942.
Suda, 1953.
Suyehiro, 1941, 1942.
Toyama, Y., et al., 1941.

Parathunnus sibi—Continued

- Uda, 1935a.
- Uehara, 1941.
- Van Campen, 1952.
- Watanabe, Haruo, 1940.
- Yabuta, 1953.
- Yabuta and Ueyanagi, 1953a.
- Yoshihara, 1951-52.

Parathynnus sibi. See *Parathunnus sibi*.*Pelamys (Pelamis)*

- Maldura, 1946.

Pelamys affine. See *Euthynnus alletteratus*.*Pelamys macropterus*. See *Neothunnus macropterus*.*Pelamys pelamys*. See *Katsuwonus*.

Population dynamics

- Aikawa, 1937.
- Bini, 1952.
- Brock, 1943.
- Tauchi, 1940a, 1940b, 1940c, 1943.
- Tominaga, 1943.

Populations, definition of

- Godsil and Byers, 1944.
- Royce, 1953.
- Schaefer, 1951, 1952.
- Schaefer and Walford, 1950.
- Sette, 1954.
- Uda and Tokunaga, 1937.
- Uda and Tsukushi, 1934.

Purse-seining

- Carlson, 1951.
- Heldt, 1932b.
- Imamura, 1953.
- Murayama and Okura, 1950, 1952.
- Murphy and Niska, 1953.
- Murray, 1952.
- Sette, 1954.

Reactions to stimuli

- Tester et al., 1952.

Red Sea

- Copley, 1947.

Red tuna. See *Thunnus thynnus*.

Reproduction

- Anonymous, 1941b.
- Bini, 1952.
- Brock, 1943.
- DeBuen, 1931, 1937.
- DeJong, 1940.
- Eckles, 1949b.
- Frade and Manças, 1933.
- Genovese, 1953.
- Hatai et al., 1941.
- Heldt, 1934.
- Ikebe, 1941b.
- June, 1953.
- Kamimura and Honma, 1953.
- Kawana, 1935.
- Kikawa, 1953.
- Kuronusu et al., 1949.
- LeDanois, 1951.
- LeGall, 1949.

Reproduction—Continued

- Lozano, 1950.
- Marr, 1948.
- Marukawa, 1939c.
- Mead, 1951.
- Nakamura, 1938, 1939b, 1943, 1949.
- Okada et al., 1935.
- Friol, 1944.
- Sanzo, 1933.
- Schaefer, 1948c, 1951.
- Schaefer and Marr, 1948b.
- Sella, 1952.
- Serventy, 1941a, 1942a.
- Sette, 1954.
- Shapiro, 1948a.
- Society for the Promotion . . . 1936.
- Wade, 1950b.
- Walford, 1937.
- Watanabe, Hajime, 1939.
- Whitehead, 1931.
- Yabe and Mori, 1948.

Rote Thun. See *Thunnus thynnus*.

Salinity. See Oceanographic conditions and related subjects.

Scomber

- Conrad, 1937.

Scouting methods

- Heldt, 1932a.

Semathunnus

- Fowler, 1933, 1934.
- Nakamura, 1939c.
- Tinker, 1944.

Sex. See Morphometrics

Sex ratios

- Brock, 1943, 1954.
- Crane, 1936.
- Iwate Pref. Fish. Expt. Sta., 1953a, 1953b.
- Kanagawa Pref. Fish. Expt. Sta., 1952a, 1952b.
- Marr, 1948.
- Miyazaki Pref. High-Seas Fish., Guidance Center, 1953.
- Murphy and Shomura, 1953a, 1953b.
- Schweiggeger, 1949.

Size composition

- Aikawa, 1937.
- Aikawa and Katō, 1938.
- Bonham, 1946.
- Brock, 1943.
- Hart et al., 1948.
- Inanami, 1942c.
- Kagoshima Pref. Fish. Expt. Sta., 1937a.
- Kamimura and Honma, 1953.
- Kanagawa Pref. Fish. Expt. Sta., 1951a, 1951b, 1952b.
- Kawana, 1934.
- Kawasaki, 1952.
- Kida, 1936.
- Kikawa, 1953.
- Kimura, 1935, 1941, 1942a.
- Kimura and Ishii, 1933a.
- Mine and Iehisa, 1940.

Size composition—Continued

- Miyazaki Pref. High-Seas Fish.
Guidance Center, 1953.
Murphy and Shomura, 1953a, 1953b.
Nakamura et al., 1953.
Nankai Reg. Fish. Res. Lab., 1951b.
Nomura et al., 1952-53.
Okamoto, 1940.
Okinawa Pref. Fish. Expt. Sta., 1931.
Okuma et al., 1935.
Onodera, 1941.
Partlo, 1951.
Powell, D. E., 1950.
Powell and Hildebrand, 1950.
Powell et al., 1952.
Sasaki, 1939a, 1939b.
Scagel, 1949.
Schaefer, 1948b, 1951.
Schaefer and Marr, 1948b.
Schaefers, 1953.
Schweigger, 1949.
Serventy, 1947.
Sette, 1954.
Tauchi, 1940a, 1940b, 1940c.
Uda, 1932b.
Uda and Tsukushi, 1934.
Westman and Neville, 1942.
Yabe and Mori, 1950.
Yabuta and Ueyanagi, 1953a, 1953b.
Yamanaka, 1950.

Skipjack. See *Katsuwonus*.

Skipjack, black. See *Euthynnus* spp.

Sōdagatsuwo. See *Auxis* spp.

South China Sea

Anonymous, 1938.

Kanamura and Imaizumi, 1936b.

Southern bluefin tuna. See *Thunnus maccoyi*

Spawning. See Reproduction.

Statistics

- Alaejos, 1931.
Anderson, Stolting, et al., 1953.
Anonymous, (1), (2), (3), 1932, 1945, 1947,
1949a, 1949b, 1952.
California. Dept. Fish and Game
California. Dept. Fish and Game, Marine Fish. Br.
Chiba Pref. Fish. Expt. Sta., 1936b.
Chiba Pref. Fish. Expt. Sta.,
Katsuura Branch, 1938b, 1941e, 1941f.
Conseil Int'l. pour l' Exploration de la Mer, 1933.
Ego and Otsu, 1952.
Ehrenbaum, 1934.
Espenshade, 1948.
Farina, 1931a.
Federation of Japan Tuna . . . 1951a, 1951b, 1952,
1953a, 1953b.
Food and Agr. Organ. U. N., 1949a.
Godsil, 1937, 1949.
Kanai, Moto and Kasu, 1938.
Lüling, 1951, 1952b.
Nakayama, 1948.

Statistics—Continued

- Navaz, 1950.
South Seas Gov't. . . . 1938.
U. S. Fish and Wildlife Service.
Stomach contents. See Food.
Striped tuna. See *Katsuwonus*.
Sumagatsuo. See *Euthynnus yaito*.
Synonymy
Barnard, 1948.
Beebe and Tee-Van, 1936.
Boeseman, 1947.
Chevey, 1932b.
Chu, 1931.
DeBeaufort and Chapman, 1951.
DeBuen, 1935.
Fish, 1948.
Food and Agr. Organ. U. N., 1949b.
Fowler, 1931, 1934, 1936, 1949.
Frade, 1931c.
Fraser-Brunner, 1949, 1950.
Ginsburg, 1953.
Heldt, 1930, 1931a, 1931b.
Herre, 1936.
Hildebrand, 1946.
Joubin, 1934.
LeGall, 1934a, 1934b, 1934c, 1934d.
Maldura, 1946.
Molteno, 1948.
Nakamura, 1939b, 1939c.
Nichols and LaMonte, 1941.
Powell, A. W. B., 1937.
Rosa, 1950.
Schaefer and Walford, 1950.
Schultz, 1949.
Schultz and DeLacy, 1936.
Serventy, 1942b.
Soldatov and Lindberg, 1930.
Tanaka, 1931.
Wade, 1949.
Whitley, 1937.

Tagging

- Alverson and Chenowith, 1951.
Anonymous, 1939a.
Conseil Int'l pour l' Exploration de la Mer, 1933.
Fukuda and Iizuka, 1940b.
Ganssle and Clemens, 1953.
Godsil, 1936, 1938b, 1938c.
Heldt, 1932b.
Kagoshima Pref. Fish. Expt. Sta., 1936c, 1938c,
1939c, 1940c.
Kawana, 1934.
Matsumoto, T., 1937.
Partlo, 1950, 1951.
Powell, D. E., 1950.
Powell et al., 1952.
Russell, F. S., 1934a.
Scagel, 1949.
Schaefers, 1952, 1953.
South Seas Gov't. . . . 1941b.

Tagging—Continued

- Uda, 1936a.
 Wilson, 1953.
- Temperature. See Body temperature, oceanographic conditions.
- Thon blanc. See *Germo*.
- Thon rouge. See *Thunnus thynnus*.
- Thunnidae
 Bellón and Bardán de Bellón, 1949.
 Nakamura, 1939b, 1941.
- Thunniformes
 Berg, 1947.
- Thunniinae
 Frade, 1932.
- Thunnus*
 Aikawa, 1933.
 Aikawa and Katō, 1938.
 Alaejos, 1931.
 Aricò and Genovese, 1953.
 Bahr, 1952.
 Barnhart, 1936.
 Bigelow and Schroeder, 1953.
 Blackburn and Rayner, 1951.
 Boeseman, 1947.
 Bonamico, 1933.
 Brock, 1938, 1949.
 Cerquetelli, 1936.
 Chabanaud, 1930.
 Conrad, 1937.
 Conseil Int'l pour l' Exploration de la Mer, 1933.
 Crane, 1936.
 DeBeaufort and Chapman, 1951.
 DeBuen, 1930, 1931, 1932, 1935, 1937.
 De La Tourrasse, 1951.
 Delsman, 1933.
 Dieuzeide, 1930, 1931.
 Dung and Royce, 1953.
 Ehrenbaum, 1934.
 Fick, 1937.
 Fish, 1948.
 Fisheries Society of Japan, 1931.
 Food and Agr. Organ. U. N., 1949b.
 Fowler, 1931, 1934, 1936, 1938, 1944.
 Frade, 1930a, 1930b, 1931a, 1931b, 1931d, 1935, 1937a, 1937b, 1953.
 Frade and Manaças, 1933.
 Fraser-Brunner, 1950.
 Fujii, 1932.
 Galtsoff, 1952.
 Genovese, 1952, 1953.
 Ginsburg, 1953.
 Godsil, 1945, 1949b.
 Godsil and Byers, 1944.
 Godsil and Holmberg, 1950.
 Heldt, 1930, 1931a, 1931b, 1932b, 1934, 1937, 1938, 1943.
 Herre, 1936, 1940.
 Hildebrand, 1946.
 Iehisa, 1939.
 June, 1952a.

Thunnus—Continued

- Kawana, 1934, 1935, 1937, 1938.
 Kida, 1936.
 Kimura, 1932, 1933, 1935.
 Kimura and Ishii, 1932, 1933a.
 LeDanois, 1933.
 Lüling, 1950, 1951, 1952a, 1952b.
 Maldura, 1946.
 Marukawa, 1939c.
 Mather, 1954.
 Mazzarelli, 1935.
 Migita and Arakawa, 1948.
 Mine and Iehisa, 1940.
 Miyama and Osakabe, 1938, 1940.
 Molteno, 1948.
 Morice, 1953a, 1953b.
 Murayama and Okura, 1950, 1952.
 Murray, 1952.
 Nakamura, 1938, 1939a, 1939b, 1943, 1949, 1951.
 Nankai Reg. Fish. Res. Lab., 1951a.
 Navarro and Lozano, 1950.
 Navaz, 1950.
 Nigrelli and Stunkard, 1947.
 Nomura et al., 1952-53.
 Oita Pref. Fish. Expt. Sta., 1930.
 Okada and Matsubara, 1938.
 Okada et al., 1935.
 Okinawa Pref. Fish. Expt. Sta., 1940b.
 Ōmori and Fujimoto, 1940.
 Ōmori and Fukuda, 1938, 1940.
 Priol, 1944.
 Reiss and Vellinger, 1929.
 Rivas, 1951, 1953.
 Roedel, 1948a.
 Rosén, 1943.
 Russell, F. S., 1933a, 1933b, 1934a, 1934b.
 Sanzo, 1932.
 Schaefer, 1948c, 1951.
 Schaeffers, 1952, 1953.
 Schultz, 1949.
 Schultz and DeLacy, 1936.
 Schweigger, 1949.
 Scordia, 1930, 1939a, 1939b, 1940, 1943.
 Sella, 1930, 1931, 1952.
 Serventy, 1941a, 1941b, 1942b, 1947.
 Shapiro, 1948a, 1948b.
 Shimada, 1951b.
 Shimizu, 1947.
 Society for the Promotion . . . 1936.
 Soldatov and Lindberg, 1930.
 Sugiura, 1932.
 Suyehiro, 1942.
 Takayama and Andō, 1934.
 Tanaka, 1931, 1939.
 Taranetz, 1937.
 Tauchi, 1940a.
 Tinker, 1944.
 Uda, 1932a, 1932b, 1935a, 1940b, 1952.
 Van Campen, 1952.
 Walford, 1931, 1937.

Thunnus—Continued

- Westman and Gilbert, 1941.
 Westman and Neville, 1942.
 Whitehead, 1930, 1931.
 Whitley, 1947.
 Wolfe Murray, 1932.
 Yabe et al., 1953.
- Thunnus alahunga*. See *Germo*.
Thunnus albacora. See *N. macropterus*.
Thunnus germo. See *Germo*.
Thunnus maccoyi
 Blackburn and Rayner, 1951.
 Boeseman, 1947.
 Dung and Royce, 1953.
 Godsil and Holmberg, 1950.
 Nomura et al., 1952-53.
 Serventy, 1941a, 1941b, 1947.
 Whitley, 1947.
- Thunnus macropterus*. See *N. macropterus*.
Thunnus mebachi. See *Parathunnus mebachi*.
Thunnus nicolsoni
 Serventy, 1942b.
- Thunnus obesus*.
 Fraser-Brunner, 1950.
- Thunnus orientalis*
 Aikawa, 1933.
 Aikawa and Katō, 1938.
 Dung and Royce, 1953.
 Fisheries Society of Japan, 1931.
 Fowler, 1934.
 Iehisa, 1939.
 June, 1952a.
 Kawana, 1934, 1935, 1937, 1938.
 Kida, 1936.
 Kimura, 1932, 1933, 1935.
 Kimura and Ishii, 1932, 1933a.
 Migita and Arakawa, 1948.
 Mine and Iehisa, 1940.
 Miyama and Osakabe, 1938, 1940.
 Murayama and Ōkura, 1950, 1952.
 Nakamura, 1938a, 1939a, 1939b, 1943, 1949, 1951.
 Nankai Reg. Fish. Res. Lab., 1951a.
 Nomura et al., 1952-53.
 Ōita Pref. Fish. Expt. Sta., 1930.
 Okada and Matsubara, 1938.
 Okada et al., 1935.
 Okinawa Pref. Fish. Expt. Sta., 1940b.
 Ōmori and Fujimoto, 1940.
 Ōmori and Fukuda, 1938, 1940.
 Shapiro, 1948a, 1948b.
 Shimada, 1951b.
 Shimizu, 1947.
 Society for the Promotion . . . 1936.
 Sugiura, 1932.
 Suyehiro, 1942.
 Takayama and Andō, 1934.
 Tanaka, 1939.
 Tauchi, 1940a.
 Tinker, 1944.
 Uda, 1932b, 1940b, 1952.

Thunnus orientalis—Continued

- Van Campen, 1952.
 Yabe et al., 1953.
- Thunnus rarus*. See *Neothunnus rarus*.
Thunnus schlegelii. See *Thunnus orientalis*.
Thunnus sibi. See *Parathunnus sibi*.
Thunnus thunnina. See *Euthynnus alletteratus*.
Thunnus thunnus. See *Thunnus thynnus*.
- Thunnus thynnus*
 Alaejos, 1931.
 Aricò and Genovese, 1953.
 Bahr, 1952.
 Barnhart, 1936.
 Bigelow and Schroeder, 1953.
 Bonamico, 1933.
 Brock, 1938, 1949.
 Cerquetelli, 1936.
 Chabanaud, 1930.
 Conseil Int'l pour l' Exploration de la Mer, 1933.
 Crane, 1936.
 DeBuen, 1930, 1931, 1932, 1935, 1937.
 De La Tourrasse, 1951.
 Delsman, 1933.
 Dieuzeide, 1930, 1931.
 Dung and Royce, 1953.
 Ehrenbaum, 1934.
 Fick, 1937.
 Fish, 1948.
 Food and Agr. Organ. U. N., 1949b.
 Fowler, 1931, 1936, 1938, 1944.
 Frade, 1930a, 1930b, 1931a, 1931b, 1935, 1937a, 1937b.
 Frade and Manaças, 1933.
 Fraser-Brunner, 1950.
 Fujii, 1932.
 Galtsoff, 1952.
 Genovese, 1952, 1953.
 Ginsburg, 1953.
 Godsil, 1949b.
 Godsil and Byers, 1944.
 Heldt, 1930, 1931a, 1931b, 1932b, 1934, 1937, 1938, 1943.
 Herre, 1936, 1940.
 June, 1952a.
 Kida, 1936.
 Kimura, 1932.
 LeDanois, 1933.
 Lüling, 1950, 1951, 1952a, 1952b.
 Marukawa, 1939c.
 Mather, 1954.
 Mazzarelli, 1935.
 Molteno, 1948.
 Morice, 1953b.
 Murray, 1952.
 Navarro and Lozano, 1950.
 Navaz, 1950.
 Nigrelli and Stunkard, 1947.
 Priol, 1944.
 Reiss and Vellinger, 1929.
 Rivas, 1951, 1953.
 Roedel, 1948a.

Thunnus thynnus—Continued

Rosén, 1943.
 Russell, F. S., 1933a, 1933b, 1934a, 1934b, 1936.
 Sanzo, 1932.
 Schultz, 1949.
 Schultz and DeLacy, 1936.
 Scordia, 1930, 1939a, 1939b, 1940, 1943.
 Sella, 1930, 1931, 1932, 1952.
 Society for the Promotion . . . 1936.
 Soldatov and Lindberg, 1930.
 Tanaka, 1931.
 Taranetz, 1937, 1944.
 Uda, 1932a, 1935a.
 Walford, 1931, 1937.
 Westman and Gilbert, 1941.
 Westman and Neville, 1942.
 Whitehead, 1930, 1931.
 Wolfe Murray, 1932.

Thunnus tonggol

DeBeaufort and Chapman, 1951.
 Fraser-Brunner, 1950.
 Serventy, 1942b.

Thunnus zacalles. See *Kishinoella zacalles*.

Thynnus affinis. See *Euthynnus alletteratus*.

Thynnus alalonga. See *Germo*.

Thynnus germo. See *Germo*.

Thynnus maccoyi. See *Thunnus maccoyi*.

Thynnus macropterus. See *N. macropterus*.

Thynnus orientalis. See *Thunnus orientalis*.

Thynnus pacificus. See *Germo*.

Thynnus pelamys. See *Katsuwonus*.

Thynnus sibi. See *Parathynnus sibi*; also *Germo*.

Thynnus thunina. See *Euthynnus alletteratus*.

Thynnus thunina. See *Euthynnus alletteratus*.

Thynnus thynnus. See *Thunnus thynnus*.

Thynnus tonggol. See *Thunnus tonggol*.

Tonno. See *Thunnus thynnus*.

Tuna (otherwise unspecified)

Aikawa, 1932.
 Anonymous, 1939b.
 Auffret, 1931.
 Bini, 1931, 1933.
 Chiba Pref. Fish. Expt. Sta.,
 Katsuura Branch, 1941e.
 Corwin, 1930.
 DeBuen and Frade, 1932.
 Domantay, 1940.
 Farina, 1931b.
 Federation of Japan Tuna . . . 1951a, 1951b, 1952,
 1953a, 1953b.
 Flett, 1944.
 Food and Agr. Organ. U. N., 1949a.
 Frade, 1932.
 Godsil, 1938c.
 Hadži, 1934.
 Hasegawa, 1937.
 Heldt, 1932a.
 Hirtz, 1933.
 Imai, 1950.
 Imaizumi, 1937.

Tuna (otherwise unspecified)—Continued

Imamura, 1953.
 Isawa, 1935.
 June, 1951a.
 Kafuku, 1950.
 Kanagawa Pref. Fish. Expt. Sta., 1951b.
 Kawana, 1935.
 Kimura and Ishii, 1931.
 Kodama, Iizuka, and Harada, 1934.
 Kreutzer, 1951b.
 LeGall, 1934e, 1951.
 McKernan, 1953.
 Marr and Schaefer, 1949.
 Marukawa, 1939a.
 Matsui, K., 1942a.
 Matsui, Y., 1938.
 Meyer, 1951.
 Mie Pref. Fish. Expt. Sta., 1950a, 1950b.
 Morović, 1950.
 Murphy and Niska, 1953.
 Murphy and Shomura, 1952, 1953a, 1953b.
 Nishikawa, 1934.
 Niska, 1953.
 Niwa, 1937.
 Noguchi, 1938.
 Okumura, 1943.
 Postel, 1949.
 Rasalan, 1950.
 Rawlings, 1953.
 Ronquillo, 1953.
 Rosa, 1950.
 Saitō, 1937.
 Sakai and Uno, 1940.
 Scordia, 1940.
 Sella, 1932.
 Sette, 1954.
 Shapiro, 1950.
 Shimada, 1951a.
 Society for the Promotion . . . 1937b.
 Šoljan, 1930.
 South Seas Gov't. . . . 1937b, 1941a.
 Tanaka, 1935, 1936.
 Tester et al., 1952.
 Thiel, 1938.
 Tomiyama, 1933.
 U. S. Fish and Wildlife Service
 Vitlov, 1949.
 Wilson, 1953.
 Zei, 1948.

Wanderer

Whitley, 1937.
 Weather correlated with fishing
 or distribution
 Murphy and Niska, 1953.
 Murphy and Shomura, 1953b.

Yellowfin tuna. See *Neothynnus macropterus*.

Young
 Bini, 1952.

Young—Continued

Delsman, 1931.
Delsman and Hardenburg, 1934.
Eckles, 1949b.
Greenhood, 1952.
Hatai et al., 1941.
Herald, 1951.
Inanami, 1942d.
Kimura and Ishii, 1931.
LeDanois, 1951.
LeGall, 1949.
Marr, 1948.
Marukawa, 1939b.

Young—Continued

Sanzo, 1932, 1933.
.Schaefer, 1948c.
Schaefer and Marr, 1948a, 1948b.
Sette, 1954.
Shimada, 1951b, 1951d.
Suda, 1953.
Uchida, 1937.
Wade, 1949, 1950a, 1951.
Yabe, 1953.
Yabe et al., 1953.
Yabe and Mori, 1948.