

**Update and World-wide distribution of Australian
fisheries resources information:**

**AUSTRALIAN FISH ON FishBase
<<http://www.fishbase.org/search.cfm>>**

A. Caton and P. Kailola



**F I S H E R I E S
R E S E A R C H &
D E V E L O P M E N T
C O R P O R A T I O N**



Project No. 97/302

Table of Contents

	Page
Table of Contents	i
Non-Technical Summary	1
Background	3
Need	3
Objectives	4
Methods	4
Results/Discussion	5
Benefits	6
Further Development	7
Conclusion	8
References	9
Appendix 1:	11
Intellectual property	
Appendix 2:	12
Staff engaged on the project	
Appendix 3:	
Information assembled on <i>Australian Fisheries Resources</i> species encompassed by the FishBase project, and a list of those species outside its scope.	13
Appendix 4:	
List of organisations and scientists approached for, or who volunteered, update material.	37
Appendix 5:	41
Poster for 1998 Conference of the Australian Society of Fish Biology.	
Appendix 6:	43
FishBase on the World Wide Web.	

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Objective:

To provide a useful, up-to-date, carefully checked national and international database of species biology, ecology and management for the commercially important fish in Australia.

Non Technical Summary

FishBase is a large biological database containing key information (such as nomenclature, taxonomy, morphology, trophic ecology, population dynamics, physiology, pictures and maps) for more than 23 000 finfish species. It is maintained and distributed by the International Center for Living Aquatic Resources Management (ICLARM) in the Philippines. The FishBase encyclopedia has previously been distributed in the form of a 2-CD package using Windows software, but its primary information is now also accessible via a developing web site <<http://www.fishbase.org/search.cfm>> (ICLARM 1999).

Information on a large number of Australian species was included in earlier versions of FishBase but most was drawn from taxonomic rather than fishery-oriented sources. In particular, these versions lacked much of the fishery information in Australian Fisheries Resources (AFR), the 1993 publication by the Bureau of Resource Sciences (now Bureau of Rural Sciences, BRS) and FRDC.

The objective of the project was to provide a useful, up-to-date, carefully checked national and international database of species biology, ecology and management for the commercially important fish in Australia. FRDC funding was provided so that AFR information could be loaded into FishBase. In addition, the FRDC provided funding for the gathering of more recent material on fisheries from biologists around Australia and provision of it to ICLARM for inclusion in the FishBase entries on the major Australian fish species covered by AFR.

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State and Commonwealth fisheries research institutions were canvassed for their support in the provision of relevant material. The process was facilitated by a poster display at the 1998 Conference of the Australian Society for Fish Biology in Hobart. This promotion resulted also in significant extension of the bibliography maintained by the Society as well as of the bibliography being compiled by the project personnel in support of the FishBase project.

Some of the AFR and new material provided by the project is already accessible in the FishBase 1998 CD release, along with the pre-existing (mainly taxonomic) information on Australian fish from earlier releases. The remaining information will be incorporated in future releases and most of it is included on the developing FishBase web site.

Many Australian fisheries specialists cooperated in the production of AFR, and again in updating the information. They can assist in the further evolution of FishBase by independently alerting ICLARM to any errors or inconsistencies in the database, and drawing attention to newly published material. ICLARM's e-mail address for the FishBase Project is <fishbase@cgiar.com>.

Background

FishBase is a large biological database containing key information (such as nomenclature, distribution, taxonomy, morphology, trophic ecology, population dynamics, physiology, biology, genetics, graphs, pictures and maps) for more than 23 000 finfish species (Froese and Pauly 1999). It is maintained and distributed by the International Center for Living Aquatic Resources Management (ICLARM) in the Philippines in collaboration with the Food and Agriculture Organisation of the United Nations. It is primarily funded by the European Commission.

FishBase is a desktop reference library, an educational tool, and an analysis package. It makes world fisheries literature readily accessible. Background information about FishBase is on the world wide web at <<http://www.fishbase.org/search.cfm>> (ICLARM 1999).

Prior to the FRDC-funded FishBase project, Australian species information in FishBase was mainly derived: from taxonomic reference sources such as Paxton et al. (1989); from general texts such as Randall et al. (1990) and Organisation for Economic Co-operation and Development (1990); and from Northern Hemisphere general texts pertaining to world fishes, such as Robins et al. (1991). Indeed, some major Australian species were not recognised by FishBase due to unresolved taxonomic status: dusky flathead, *Platycephalus fuscus*, pink snapper, *Pagrus auratus*, ocean perch, *Helicolenus* species and blue-spot emperor, *Lethrinus choerorhynchus*.

Because of that restricted sourcing situation, synopses of species contained very limited fishery information. More usually, they contained brief notes on ecology, distribution, nomenclature, FAO catch statistics, physiology and sometimes morphology. Sometimes the information was inaccurate—such as for gemfish, *Rexea solandri*. The most detailed coverage for Southern Hemisphere fishes was usually for the species that also inhabited Northern Hemisphere waters (e.g. tailor, *Pomatomus saltatrix*) and even so, FishBase information on the species' fisheries and habits from the 'southern perspective' was again limited.

In 1993, *Australian Fisheries Resources* (AFR) provided a comprehensive overview of the major commercially important Australian species (Kailola et al 1993). Much of that AFR information and the new information that continued to become available on the species had not subsequently found its way onto FishBase. Accordingly, it seemed appropriate to make arrangements for entry of the AFR information onto FishBase, especially given the globally accessible nature of that database. There would also be the opportunity to update the AFR information where possible with more recently available information.

Need

Australian scientists, managers, policy makers, industry, business, students and the public involved with matters relating to fish, fish biology and fisheries have a basic need

for information on Australian fish and, increasingly, fishes from other oceans. As a centralised global database, accessible widely, FishBase is an efficient way of providing such a reference source once comprehensive data on important Australian fishes have been entered and checked for accuracy.

Objectives

To provide a useful, up-to-date, carefully checked national and international database of species biology, ecology and management for the commercially important fish in Australia.

Methods

A project officer was appointed at the Bureau of Rural Sciences for six months to liaise with fisheries specialists around Australia to assemble published and recent material on species encompassed by FishBase (Appendix 3). In this context, it is relevant to note that invertebrate species that support fisheries (for example rock lobsters, prawns, and oysters) are outside the scope of FishBase so were not included in the data search.

At the outset, the project officer and the BRS contacted State and Commonwealth institutions involved in fisheries research and management, informing them of the project and seeking the cooperation and assistance of their staff in the identification and provision of relevant material. Individual experts in particular fish groups, or persons who had contributed significantly to the preparation of presentations in AFR, were also contacted directly (Appendix 4).

ICLARM provided BRS and the project officer with copies of 'FishBase 97' and in return was provided with a copy of AFR from which it commenced extraction of material for entry onto FishBase. Concurrently the project officer commenced a comparison of the information content of AFR and FishBase 97, a process that enabled identification of where information was lacking and what information needed to be checked. The comparisons were made after setting up spreadsheets for the different data headings used by FishBase: each subheading was checked in AFR and FishBase, but where the information was at variance the entry was flagged. This outline provided a basis for correcting entries, searching for missing information (if such were available) and augmenting FishBase 97's synopses. As part of the search, and as an additional approach to finding out what more recent studies had been done on the AFR species, the project officer undertook a search of Australian fisheries literature.

Another step in the checking and updating was a process whereby when ICLARM completed entry of AFR information on a species, it sent a print-out of the synopsis for that species to the project officer in Australia. Here, the synopsis was checked for consistency (for example, literature citations) and accuracy of transcription of information from AFR. Ultimately, copies of papers containing more recent or additional information were despatched back to ICLARM with the synopsis comments.

Sometimes, lists of species references were sent as well. ICLARM is amending the AFR species' synopses to take account the editing suggestions and amendments: few of the synopses were modified in time for publication in 'FishBase 98', but will be reflected in future releases.

The 1998 Conference of the Australian Society for Fish Biology in Hobart provided an opportunity to present a poster (Caton et al. 1998 and Appendix 5) and an operational display of FishBase on a laptop computer. This process further alerted the Australian fisheries biology community to the existence of the FishBase project. The poster and laptop display also facilitated project personnel access to reference material, at the same time resulting in significant extension of the bibliography maintained by the Society (Australia Society for Fish Biology, ongoing).

Results/Discussion

The major results are:

1. Australian fisheries scientists and the fisheries community are aware that AFR is being updated, albeit in electronic format;
2. ICLARM's FishBase presentations for fish species that are commercially harvested in Australia are remarkably improved, more up-to-date and authenticated. On this point, it is worth bearing in mind that such steps assist the worldwide fishing community—as well as that in Australia—gain better information about Australian fisheries resources.
3. An enlarged bibliography of Australian fisheries literature.

There is no simple manifestation of the project to display as a 'package' of results. It would be needless duplication to print all 'Atlas' species information from FishBase, but an example is provided (Appendix 6). For the purposes of this report it is presumably adequate to direct attention to the current FishBase CD/Manual release and to the 'World Wide Web' site. Extracts from that web site (Appendix 6) using indicative pages for an Australian species example will illustrate the clarity and accessibility of the encyclopedia.

The bibliography generated in the course of the FRDC project is a combination of the references identified by Dr Kailola in the course of her work, some of the bibliography maintained by the Australian Society for Fish Biology (ASFB) and those further references provided by collaborators with the project. The presence of project staff with a copy of the listing at the 1998 ASFB Annual Conference provided an excellent opportunity to draw the bibliography to the attention of Australian fisheries biologists, and encourage their provision of advice of relevant publications. Several individual bibliographies were submitted later as a result of that event.

The new bibliography has the scope to represent a major expansion of the ASFB bibliography, and to be the basis for ASFB's release of future updates as members of that Society provide them for incorporation. A feature of the new bibliography is its high proportion of 'grey literature', a category of information not usually available through global abstracting and referencing databases and therefore difficult to source by

non-specialists. That this combined 'FishBase/ASFB' bibliography provides access to that literature accentuates the need for it to be upgraded, regularly updated and maintained. This may include its being made available on the World Wide Web.

The bibliographic list represents a useful author and content information source but the current format is rather primitive. Its usefulness would be improved were the entries to be transferred to a bibliographic software package. Time and resources did not permit that as a component of the project.

Benefits

The project sought to ensure that scientists, managers, policy-makers, members of industry, business and the public can be better informed about Australian fishes through access to a broader range of information. ICLARM is very positive about the value of FishBase as a convenient and informative reference base, and cites a range of examples of potential users and benefits. Repetition of them below provides an indication of FishBase's scope:

- fisheries managers will dive into the largest existing compilation of population dynamics data;
- teachers and students will find numerous graphs illustrating basic concepts of fish biology;
- taxonomists will enjoy access to Eschmeyer's (1998) 'Catalog of Fishes' databases [Eschmeyer's (1998) catalogue of the species of fishes is incorporated into the 1998 CD version];
- conservationists will use the lists of threatened fishes for any given country (IUCN 1996) as well as the huge collection of fish occurrences;
- policy makers may be interested in a chronological, annotated list of introductions to their country;
- research scientists, as well as funding agencies will find it useful to gain a quick overview of what is known and what is still unknown about a certain species;
- zoologists and physiologists will have the largest existing compilations of fish morphology, metabolism, gill area, eye pigment, brain size, or swimming speed at their fingertips;
- ecologists will likewise use data on diet composition, trophic levels, food consumption, prey and predators as inputs for their models;
- aquaculturists will see functional databases on genetic traits and culture experiments, as well as the foundation for a global strains registry;
- geneticists will find the largest compilation of allele frequencies;
- the fishing industry will find proximate analysis, as well as processing recommendations for many marine species;
- anglers will enjoy a listing of all game fishes occurring in a particular country (IGFA 1994); and
- scholars interested in local knowledge will find more than 80,000 common names of fishes together with the language/culture in which they are used and comments on their etymology.

The FRDC project has revitalised the Australian information contained in AFR and made it available in modern electronic media to a wider international audience than was reached by hard copy.

Further Developments

FishBase already represents an impressively significant reference on fish, currently containing information on more than 23 000 of the approximately 25 000 known species globally. In that context the material contributed by the project—on just 101 important Australian commercial species—may seem insignificant. However, only a small proportion of species on FishBase has datafields covered in similar detail and reliability, so the project has ‘fast-tracked’ consolidation and accessibility of this Australian component (compared to information for other countries). Examples include datafields on Distribution (incorporating fishery and resource information and stock status); Spawning and Maturity; Food items and Growth Parameters.

On the other hand, by far the majority of Australian fish species on FishBase are taxa not covered by AFR. Many are information-poor and deserve further research attention. Information on many of these taxa exists in the ASFB and FishBase Project’s bibliographies and can, with a reduced effort, be incorporated into FishBase and their entries checked. Nevertheless, because ongoing intensive use of the major AFR species will in all probability mean that few research funds will be available for species of lesser commercial or ‘popular’ significance, it is important that ongoing efforts are made to ensure that disparate information on all Australian species is drawn into the FishBase ambit. Only in this way, over time, will an integrated and more detailed information base of our nation’s fish stocks be constructed.

As AFR species will be the focus of ongoing research, new findings about them and details of changes in fisheries associated with them will continue to generate the requirement for consequential revisions of FishBase entries. To that end, ICLARM might be seen as a routine recipient of relevant new publications on these species. However, this scenario raises the issue of resource limitations. ICLARM has responsibility on a global scale and, just as it required Australian funding assistance to encompass the data processing load associated with the current project, it would need similar assistance for any substantial future data upgrades. Perhaps the most responsible approach to this matter would be development of an Australian ‘FishBase’ web site, tasked with the function of maintaining and expanding a strong reference base in relation to Australian species. Such a website would have to be run in collaboration with ICLARM however, to ensure reliable information transfer to and from the original FishBase.

There have been suggestions that a new edition of AFR would be timely because much of its fisheries information (in particular, catch and value information) is now almost a decade old and thus out-of-date. While access to timely information via the World Wide Web or CD packs can in part satisfy the need, the ‘fishery’ rather than ‘species’ focus of

data integration and presentation are the strength of AFR and could usefully be updated. Work in progress in the Bureau of Rural Sciences on integration of Australian fisheries statistics data would fast track one of the tasks that was a laborious precursor to preparation of the first edition (Stewart, Kailola and Ramirez, 1991). Even so, there would once again be need for a strong writing and editing team supported by broad and enthusiastic cooperation among all States and the Commonwealth for the identification and provision of relevant biological and fishery information for a revision. This may not be as difficult a hurdle as may be perceived: AFR remains a popular book ('bible') among Australian fisheries biologists and is spoken of proudly by its very many contributors.

Recommendations to FRDC

1. Support to enable ICLARM to upgrade its database on Australian lesser commercial and 'popular' species of fish.
2. Support for an Australian 'FishBase' web site, tasked with the function of maintaining and expanding a strong reference base in relation to Australian species. Such a website would have to be run in collaboration with ICLARM.
3. Serious and positive consideration be given to producing either a new edition of AFR or some form of hard copy revision sheets for AFR and newly commercial species (such as Patagonian toothfish).
4. Support for maintenance and regular updating of ASFB's bibliography with consideration of its being made available on the World Wide Web.

Conclusion

The objective of the project was to provide a useful, up-to-date, national and international database of species biology, ecology and management for the commercially important fish in Australia (at least 100 species according to AFR). This objective has been achieved by ICLARM's transfer of AFR information, and additional update material, onto FishBase, an internationally accessible electronic encyclopedia on fishes. Other outcomes of the project have been the broadening of the Australian fisheries scientific community's awareness of FishBase, renewed awareness of AFR and dissemination of its information, and major expansion of the Australian Society for Fish Biology bibliography.

Copies of FishBase can be obtained for US\$95 from ICLARM. This price includes a CD-ROM, a manual and the cost of airmail. Alternatively, for people with access to the Internet, FishBase can be accessed on: <http://www.fishbase.org/search.cfm>.

To be able to run FishBase 98, a computer capable of running Microsoft Windows 95 or Windows NT having at least 16 megabytes of RAM (32 megabytes is better) is needed. A CD-ROM drive is also required, and a mouse. Picture quality is enhanced through the use of a VGA monitor and video card capable of displaying at least 256 (better, 65,000) colours. FishBase forms are designed for standard VGA resolution. Finally, for

FishBase to run properly, several files have to be installed on the user's computer's hard disk.

FishBase is updated and released annually. FishBase on the web is updated monthly. The database is dynamic, growing in comprehensiveness and usefulness by successive enhancement. It contains errors and omissions, but each annual release adds to the information base, corrects errors, and strengthens the database's robustness. The Australian commercial species data entries on FishBase have been subject to rigorous editing and correction.

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Froese, R. and D. Pauly, Editeurs; N. Bailly et M.L.D. Palomares, Traducteurs (1999) *FishBase 99: Concepts, structure and data sources*. ICLARM. Manila, Philippines. 293 pp. [Includes a 2 CD-ROM software package representing the FishBase database and a disk of fish pictures.]

ICLARM (1999) *FishBase 99: a global information system on fishes*. Published on the World Wide Web at <http://www.fishbase.org/search.cfm>.

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[FishBase has been reviewed by R.A. McCall and R.M. May in *Nature*, Vol. 378:735, 31 August 1995; K. Matsuura in *Japanese Journal of Ichthyology*, Vol. 42(3/4):342; and M. P Francis in *New Zealand Journal of Marine and Freshwater Research*, 31:282–284.]

Intellectual Property

The objective of this project was not the generation of new information nor intellectual property, but rather the improvement of access to, and of dissemination of, previously published research findings on important Australian fish species. In this way the project has ‘valued-added’ to prior research. In particular, it has updated and made available the wealth of information assembled in the joint Bureau of Resource Sciences and Fisheries Research and Development Corporation publication *Australian Fisheries Resources* to a new, global, audience.

Staff Engaged on the Project

Australia:

Principal Investigator

Dr Derek Staples; Deputy Executive Director, Bureau of Rural Sciences.

Project Development

Dr Chris O'Brien; then Program Leader, Aquatic Resources and Information Systems, Bureau of Rural Sciences (now New Zealand Ministry of Agriculture, Fisheries and Forestry)

Day-to-day Project Supervision

Albert Caton; Sustainable Fishing and Aquaculture Section, Bureau of Rural Sciences

Data Collation and Database Editing

Dr Patricia Kailola; Fisheries Consultant, 19 Walkers Ave., Newnham, Tasmania 7248

Philippines:

Supervision

Dr Rainer Froese; ICLARM FishBase Project Leader since 1990

Data Extraction and Entry

Ms Susan Luna; ICLARM officer assigned to the Australian project

Various other ICLARM data entry subject specialists

Appendix 3:

Information assembled on *Australian Fisheries Resources* species encompassed by the FishBase project, and a list of those species outside its scope.

The Australian Fisheries Resources species encompassed by the FishBase Project, accompanied by titles of references despatched to ICLARM, are listed below. References are sent to ICLARM because it requires the actual documentation of each piece of information entered onto its database. Whereas ICLARM has accepted that AFR information is valid (and hence does not need to sight all the references cited therein) some AFR references were sent to ICLARM as information in them is additional to that required for the AFR presentation and can be incorporated into FishBase's much broader compass.

At the end of the BRS/FRDC project, the complete project bibliography will be sent to ICLARM for further augmentation of FishBase.

As the BRS/FRDC project proceeded, additional references on species already completed may have come to hand. Sometimes these were forwarded, but if not, they can be picked up from the complete bibliography.

The reference listing is followed by a list of major and minor species that are **not** encompassed by the BRS/FRDC FishBase Project:

- Invertebrates are not included because FishBase does not encompass invertebrates.
- Minor species from AFR are not included because they fell outside the scope of the Project.

General references

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2. School shark, *Galeorhinus galeus*

Walker, T.I. 1976. Effects of species, sex, length and locality on the mercury content of the school shark *Galeorhinus australis* (Macleay) and gummy shark *Mustelus antarcticus* Guenther from south-eastern Australian waters. *Australian Journal of Marine and Freshwater Research*, 27: 603-616.

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3. Gummy shark, *Mustelus antarcticus*

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- 6. Blacktip shark, *Carcharhinus tilstoni*, and**
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- 73. Luderick, *Girella tricuspidata***
[no entries]
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79. Blue threadfin, *Eleutheronema tetradactylum*

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82. Spiny icefish, *Chaenodraco wilsoni*,

83. Antarctic silverfish, *Pleuragramma antarcticum*, and

84. Blunt scalyhead, *Trematomus eulepidotus*

[no entries]

85. Skipjack tuna, *Katsuwonus pelamis*

Ward, P., Hampton, J. and Gunn J. 1999. Eastern tuna and billfish fishery - skipjack. pp 59-64, In: *Fishery status reports 1998. Resource assessments of Australian Commonwealth Fisheries*. Caton, A.E., McLoughlin, K. and Staples, D. (eds). Canberra: Bureau of Resource Sciences.

86. Spanish mackerel, *Scomberomorus commerson*,

87. Spotted mackerel, *Scomberomorus munroi*,

88. School mackerel, *Scomberomorus queenslandicus*, and

89. Grey mackerel, *Scomberomorus semifasciatus*

- Begg, G.A., Cameron, D.S. and Sawynok, W. 1997. Movements and stock structure of school mackerel (*Scomberomorus queenslandicus*) and spotted mackerel (*S. munroi*) in Australian east-coast waters. *Marine and Freshwater Research* 48(4): 295 - 301.
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90. Albacore, *Thunnus alalunga*

[no entries]

91. Yellowfin tuna, *Thunnus albacares*

- Ward, P., Hampton, J., Campbell, R. and Gunn, J. 1999. Eastern tuna and billfish fishery - yellowfin, bigeye and swordfish. pp 47-58, In: *Fishery status reports 1998. Resource assessments of Australian Commonwealth Fisheries*. Caton, A.E., McLoughlin, K. and Staples, D. (eds). Canberra: Bureau of Resource Sciences.
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- Robins, C., Polacheck, T. and Caton, A.E. 1999. Southern bluefin tuna fishery. pp 99-106, In: *Fishery status reports 1998. Resource assessments of Australian Commonwealth Fisheries*. Caton, A.E., McLoughlin, K. and Staples, D. (eds). Canberra: Bureau of Resource Sciences.

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93. Bigeye tuna, *Thunnus obesus*

Ward, P., Hampton, J., Campbell, R. and Gunn, J. 1999. Eastern tuna and billfish fishery - yellowfin, bigeye and swordfish. pp 47-58, In: *Fishery status reports 1998. Resource assessments of Australian Commonwealth Fisheries*. Caton, A.E., McLoughlin, K. and Staples, D. (eds). Canberra: Bureau of Resource Sciences.

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Speare, P. 1994. Relationships among black marlin, *Makaira indica*, in eastern Australian coastal waters, inferred from parasites. *Australian Journal of Marine and Freshwater Research*, 45(4): 535-549.

95. Blue marlin, *Makaira mazara*

96. Striped marlin, *Tetrapturus audax*

[no entries]

97. Broadbill swordfish, *Xiphias gladius*

Ward, P., Hampton, J., Campbell, R. and Gunn, J. 1999. Eastern tuna and billfish fishery - yellowfin, bigeye and swordfish. pp 47-58, In: *Fishery status reports 1998. Resource assessments of Australian Commonwealth Fisheries*. Caton, A.E., McLoughlin, K. and Staples, D. (eds). Canberra: Bureau of Resource Sciences.

98. Blue eye, *Hyperoglyphe antarcticum*

Baelde, P. 1995. Research suggests caution with blue-eye trevalla. *Professional Fisherman* 18(1): 20-23.

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Last, P., Bolch, C. and Baelde, P. 1993. Discovery of juvenile blue-eye. *Australian Fisheries*, August 1993: 16-17.

99. Blue warehou, *Seriolella brama*, and

100. Spotted warehou, *Seriolella punctata*

Bloch, C.J.S., Ward, R.D. and Last, P.R. 1994. Biochemical systematics of the marine fish family Centrolophidae (Teleostei: Stromateoidei) from Australian waters. *Australian Journal of Marine and Freshwater Research* 45: 1157-1172.

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101. Ocean jacket, *Nelusetta ayraudi*

Musa, J.C. 1992. Genetic variation of Australian ocean jacket (*Nelusetta ayraudi*) populations - pilot study. *Australian Society for Fish Biology Newsletter* 22(2): 44. (abstract)

Table 1. MAJOR AUSTRALIAN FISHERIES RESOURCES SPECIES NOT IN FISHBASE

Class	Scientific name	Common name	
Mollusca	<i>Amusium balloti balloti</i>	Ballot's saucer scallop	
	<i>Amusium balloti</i> subsp nov.	Western saucer scallop	
	<i>Amusium pleuronectes</i>	Delicate saucer scallop	
	<i>Crassostrea gigas</i>	Pacific oyster	
	<i>Haliotis laevigata</i>	Greenlip abalone	
	<i>Haliotis rubra</i>	Blacklip abalone	
	<i>Loligo chinensis</i>	Mitre squid	
	<i>Loligo edulis</i>	North-west pink squid	
	<i>Mytilus edulis planulatus</i>	Blue mussel	
	<i>Nototodarus gouldi</i>	Arrow squid	
	<i>Octopus australis</i>	Southern octopus	
	<i>Octopus maorum</i>	Maori octopus	
	<i>Octopus pallidum</i>	Pale octopus	
	<i>Octopus tetricus</i>	Gloomy octopus	
	<i>Pecten fumatus</i>	Southern scallop	
	<i>Pinctada maxima</i>	Pearl oyster	
	<i>Saccostrea commercialis</i>	Sydney rock oyster	
	<i>Sepioteuthis australis</i>	Southern calamary	
	<i>Sepioteuthis lessoniana</i>	Northern calamary	
	Crustacea	<i>Cherax destructor</i>	Yabby
<i>Cherax quadricarinatus</i>		Redclaw	
<i>Cherax tenuimanus</i>		Marron	
<i>Euphausia superba</i>		Antarctic krill	
<i>Haliporoides sibogae</i>		Royal red prawn	
<i>Jasus edwardsii</i>		Southern rock lobster	
<i>Jasus verreauxi</i>		Eastern rock lobster	
<i>Metapenaeus bennettae</i>		Greasyback prawn	
<i>Metapenaeus endeavouri</i>		Blue endeavour prawn	
<i>Metapenaeus ensis</i>		Red endeavour prawn	
<i>Metapenaeus macleayi</i>		School prawn	
<i>Panulirus cygnus</i>		Western rock lobster	
<i>Panulirus ornatus</i>		Ornate rock lobster	
<i>Penaeus esculentus</i>		Brown tiger prawn	
<i>Penaeus indicus</i>		Red-legged banana prawn	
<i>Penaeus latisulcatus</i>		Western king prawn	
<i>Penaeus longistylus</i>		Red spot king prawn	
<i>Penaeus merguensis</i>		White banana prawn	
<i>Penaeus monodon</i>		Giant tiger prawn	
<i>Penaeus plebejus</i>		Eastern king prawn	
<i>Penaeus semisulcatus</i>		Grooved tiger prawn	
<i>Portunus pelagicus</i>		Blue swimmer crab	
<i>Ranina ranina</i>		Spanner crab	
<i>Scylla serrata</i>		Mud crab	
<i>Thenus orientalis</i>		Mud bug	
<i>Thenus</i> nov sp		Sand bug	
Echinodermata		<i>Heliocidaris erythrogramma</i>	Purple sea urchin

Table 2. MINOR AUSTRALIAN FISHERIES RESOURCES SPECIES NOT ENCOMPASSED BY THE BRS/FRDC FISHBASE PROJECT

<u>Class</u>	<u>Scientific name</u>	<u>Common name</u>	<u>AFR page:</u>	
Annelida	<i>Australonereis</i> species	Beach worm	393	
	<i>Australonuphis</i> species	Beach worm	393	
	<i>Glycera</i> species	Blood worm	393	
	<i>Marphysa</i> species	Blood worm	393	
	<i>Onuphis</i> species	Beach worm	393	
Coelenterata	<i>Catostylus mosaicus</i>	Brown jelly blubber	395	
	<i>Phyllorhiza punctata</i>	Brown jellyfish	395	
Crustacea	<i>Heterocarpus sibogae</i>	White carid prawn	394	
	<i>Heterocarpus woodmasoni</i>	Red carid prawn	394	
	<i>Ibacus alticrenatus</i>	Prawn killer	396	
	<i>Ibacus brucei</i>	Bruce's bug	396	
	<i>Ibacus ciliatus pubescens</i>	Hairy bug	396	
	<i>Ibacus novemdentatus</i>	Nine-toothed bug	396	
	<i>Ibacus peronii</i>	Slipper lobster	396	
	<i>Ibacus</i> species	Smooth bug	396	
	<i>Metanephrops australiensis</i>	Australiensis scampi	396	
	<i>Metanephrops boschmai</i>	Boschi's scampi	396	
	<i>Metanephrops velutinus</i>	Velvet scampi	396	
	<i>Ovalipes australiensis</i>	Sand crab	395	
	<i>Pseudocarcinus gigas</i>	King crab	395	
	Mollusca	<i>Chlamys asperrima</i>	Doughboy scallop	394
		<i>Haliotis roei</i>	Roe's abalone	395
		<i>Hippopus hippopus</i>	Horse's hoof clam	394
		<i>Katelysia rhytiphora</i>	Venus shell	397
<i>Katelysia scalarina</i>		Venus shell	397	
<i>Nototodarus hawaiiensis</i>		Hawaiian arrow squid	108	
<i>Plebidonax deltoides</i>		Pipi	395	
<i>Sepia apama</i>		Australian giant cuttlefish	394	
<i>Sepia esculenta</i>		Golden cuttlefish	394	
<i>Sepia pharaonis</i>		Pharaoh's cuttlefish	394	
<i>Tectus niloticus</i>		Trochus	396	
<i>Tridacna crocea</i>		Boring clam	394	
<i>Tridacna derasa</i>		Smooth giant clam	394	
<i>Tridacna gigas</i>		Giant clam	394	
<i>Tridacna maxima</i>		Rugose clam	394	
<i>Tridacna squamosa</i>		Fluted giant clam	394	
<i>Turbo undulatus</i>		Turban shell	396	
Echinodermata	<i>Actinopyga echinites</i>	Deepwater redfish	393	
	<i>Actinopyga mauritiana</i>	Surf redfish	393	
	<i>Holothuria atra</i>	Lolly fish	393	
	<i>Holothuria fuscogilva</i>	White teatfish	393	
	<i>Holothuria nobilis</i>	Black teatfish	393	
	<i>Holothuria scabra</i>	Sand fish	393	
	<i>Thelenota ananas</i>	Prickly redfish	393	
Pisces— elasmobranchs	<i>Callorhynchus milii</i>	Elephant fish	399	
	<i>Centrophorus harrissoni</i>	Dumb dogfish	398	
	<i>Centrophorus scalpratus</i>	Endeavour dogfish	398	
	<i>Centroscymnus</i> species	Velvet dogfish	398	
	<i>Centrophorus uyato</i>	Southern dogfish	398	
	<i>Dalatias</i> species	Seal shark	398	
	<i>Etmopterus</i> species	Lantern shark	398	
	<i>Prionace glauca</i>	Blue shark	397	
	<i>Pristiophorus cirratus</i>	Common saw shark	401	
	<i>Pristiophorus nudipinnis</i>	Southern saw shark	401	
	<i>Raja</i> species	Skate	402	
	<i>Squalus acanthias</i>	White-spotted dogfish	398	
	<i>Squalus megalops</i>	Spiked dogfish	398	
	<i>Squalus mitsukurii</i>	Green-eyed dogfish	398	
	<i>Squatina australis</i>	Australian angel shark	397	
<i>Squatina tergocellata</i>	Ornate angel shark	397		

Pisces— teleosts	<i>Scomber australasicus</i>	Blue mackerel	397
	<i>Ariomma indica?</i>	Indian eyebrowfish	397
	<i>Arius leptaspis</i>	Golden cobbler	399
	<i>Arius midgleyi</i>	Lake Argyle silver cobbler	399
	<i>Arius thalassinus</i>	Giant salmon catfish	399
	<i>Arius</i> species	Yellow-mouthed catfish	399
	<i>Atractoscion aequidens</i>	Teraglin	402
	<i>Carangoides</i> species	Trevally	403
	<i>Caranx</i> species	Trevally	403
	<i>Centroberyx gerrardi</i>	Bight redfish	234
	<i>Chelidonichthys kumu</i>	Red gurnard	401
	<i>Coryphaena hippurus</i>	Dolphinfish	398
	<i>Diagramma pictum</i>	Sweetlip	402
	<i>Emmelichthys nitidus</i>	Redbait	400
	<i>Galaxias</i> species	Native trout	403
	<i>Genypterus tigerinus</i>	Rock ling	224
	<i>Gerres subfasciatus</i>	Silver biddy	402
	<i>Hyperlophus vittatus</i>	Sandy sprat	401
	<i>Hyporhamphus regularis</i>	River garfish	227
	<i>Latridopsis forsteri</i>	Bastard trumpeter	403
	<i>Latris lineata</i>	Stripey trumpeter	403
	<i>Lepidopus caudatus</i>	Southern frostfish	402
	<i>Liza argenteus</i>	Flat-tailed mullet	399
	<i>Lovettia sealei</i>	Whitebait	403
	<i>Lutjanus</i> spp (several)	Snapper	303
	Macouridae	Whiptails	403
	<i>Nemadactylus valenciennesi</i>	Queen snapper	400
	<i>Nematalosa vlaminghi</i>	Perth herring	400
	<i>Nemipterus furcosus</i>	Rosy threadfin bream	398
	<i>Nemipterus hexodon</i>	Ornate threadfin bream	398
	<i>Nemipterus peronii</i>	Notched threadfin bream	398
	numerous species	Marine aquarium fish	400
	<i>Paristiopterus gallipavo</i>	Yellow-spotted boarfish	397
	<i>Paristiopterus labiosus</i>	Giant boarfish	397
	<i>Parupeneus</i> species	Goatfish	399
	<i>Pentaceros decacanthus</i>	Big-spined boarfish	397
	<i>Perca fluviatilis</i>	Redfin perch	401
	<i>Platycephalus speculator</i>	Yank flathead	403
	<i>Plectorhinchus</i> species	Sweetlip	402
	<i>Plectropomus areolatus</i>	Squaretail coral trout	259
	<i>Pleuroscopus pseudodorsalis</i>	Purple stargazer	400
	<i>Psenopsis anomala</i>	Black-spot butterflyfish	397
	<i>Pterygotrigla polyommata</i>	Latchet	401
	<i>Rhabdosargus sarba</i>	Tarwhine	402
	<i>Rhombosoleina tapirina</i>	Greenback flounder	399
	<i>Sardinella lemuru</i>	Scaly mackerel	402
	<i>Saurida micropectoralis</i>	Short-finned lizardfish	399
	<i>Saurida undosquamis</i>	Checkered lizardfish	399
	<i>Scomber australasicus</i>	Blue mackerel	397
	<i>Scomberoides</i> species	Queenfish	403
<i>Seriola dumerili</i>	Amberjack	290	
<i>Sillago analis</i>	Golden-lined whiting	275–9	
<i>Sillago robusta</i>	Stout whiting	272–3	
<i>Sphyraena novaehollandiae</i>	Snook	402	
<i>Thunnus tonggol</i>	Longtail tuna	400	
<i>Trachurus novaezelandiae</i>	Yellowtail	403	
<i>Upeneichthys</i> species	Goatfish	399	
<i>Zanclistiis elevatus</i>	Black-spotted boarfish	397	

Appendix 4:

List of Organisations and Scientists approached for, or who volunteered, update material (The list indicates scientists' affiliation at the time material was provided).

New South Wales:

Australian Museum:	Jeff Leis
AWT Ensign:	Tony Miskiewicz
NSW Aquaculture Centre:	John Nell
NSW Fisheries (& Fisheries Research Institute):	Carolyn Bland
	Kerrie Deguara
	Doug Ferrell
	Bronwyn Gillanders
	John Glaister
	Charles Gray
	John Harris
	Garry Henry
	Steve Kennelly
	Warwick Nash
	John Virgona
University of New South Wales:	Patricia Dixon
University of Sydney:	Mike Kingsford

Queensland:

Australian Institute of Marine Science:	Mike Cappo
	David Williams
Bribie Island. Aquaculture Research Centre:	Adrian Collins
	Mike Potter
CSIRO Division of Marine Research, Cleveland:	Don Heales
	David Vance
Centre for Food Technology:	Peter Skarszewski
Department of Primary Industries:	John Pollock
	Simone Retif
	Zena Seliga
Freshwater Fisheries & Aquaculture Centre:	Chris Barlow
Griffith University:	Angela Arthington
Northern Fisheries Centre:	Rod Garrett
	Melita Samoily
Private:	Lucy Crowley
	Tomi Petr
Queensland Fisheries Management Authority:	Phil Cadwallader
	Darren Cameron
Southern Fisheries Centre:	Ian Brown
	Adam Butcher
	Ian Halliday
	Geoff McPherson
	Wayne Sumpton

Victoria:

Deakin University:

Department of Natural Resources & Environment:

Laurie Laurenson
Alan Baxter
Murray MacDonald
Richard McLoughlin
Ross Winstanley

Marine & Freshwater Research Institute:

Director
Kylie Hall
Ian Knuckey
Sandy Morison
Francisco Neira

Marine & Freshwater Research Inst., Snob's Creek:

The librarian
Geoff Gooley
Brett Ingram

South Australia:

Primary Industries South Australia.:

Gary Morgan

South Australian Research & Development Institute:

Shaun Collin
Tony Fowler
Keith Jones
John Keesing
The librarian
Tim Ward
Sean Connell

University of Adelaide:

Western Australia:

Fisheries Western Australia:

Mark Cliff
Rod Lenanton
Steve Newman
Jim Penn
Marie Wapnah
Margaret Platell
Shaun Collin

Murdoch University:

University of Western Australia:

Tasmania:

Australian Maritime College:

Colin Buxton
Chris Nichols
Nick Rawlinson
Maria Soroka
Marc Wilson

CSIRO Division of Marine Research:

Denis Abbott
Nan Brae
Ross Daley
Nick Elliott
Ben Mooney
Meredith Newman
Peter Nicholls
John Stevens
Gordon Yearsley

Department of Primary Industry & Fisheries:

Kim Evans
Jeremy Lyle
Ray Murphy
Mark Grubert
Barbara Nowak

Private:

University of Tasmania:

Northern Territory:

Dept of Primary Industry & Fisheries:

Rik Buckworth
David Hall
Tracy Hay
Julie Lloyd

ACT:

Environment ACT:

Mark Lintermans

Appendix 5:

Poster for 1998 Conference of the Australian Society of Fish Biology.

Appendix 6:

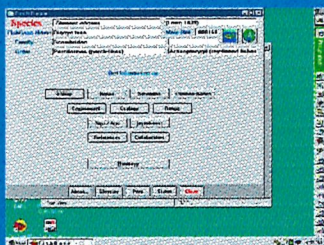
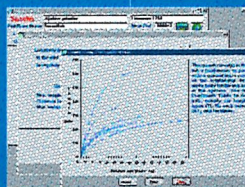
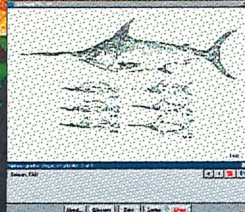
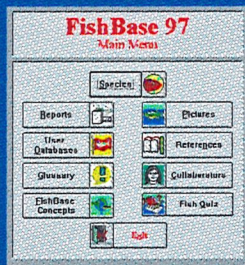
FishBase on the World Wide Web.

(<http://www.fishbase.org/search.cfm>)

Some copies of graphics from the FishBase web site are provided below to illustrate the clarity and accessibility of the encyclopedia. There is also an example of an edited print-out of a synopsis from FishBase for an AFR species—yellowfin bream. A new feature of FishBase shows a summary of this information in a Key Facts page, where users can replace default settings with their own estimates and recalculate several important life history and fisheries parameters, including yield-per-recruit analysis and estimation of optimum exploitation rate.

FishBase

A Computerised Reference Library



FISHBASE is a large biological database containing key information (nomenclature, taxonomy, morphology, trophic ecology, population dynamics, physiology, pictures, maps etc.) for more than 17,500 finfish.

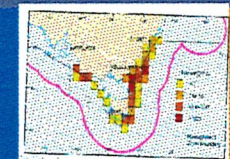
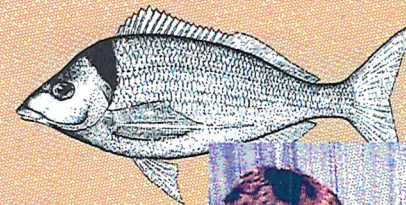
FISHBASE is maintained and distributed by the International Center for Living Aquatic Resources Management in the Philippines, via a 2-CD package using Windows software. Background information about FISHBASE is on the World Wide Web.

Australian Fisheries Resources information in FishBase

A Bureau of Resource Sciences project funded by the Fisheries Research and Development Corporation is transferring data from *Australian Fisheries Resources* to FishBase, ICLARM's electronic encyclopedia on fish, and updating it with more recent information.

Morwong

Nemadactylus species



Morwong

This presentation is on 2 species, Jackass

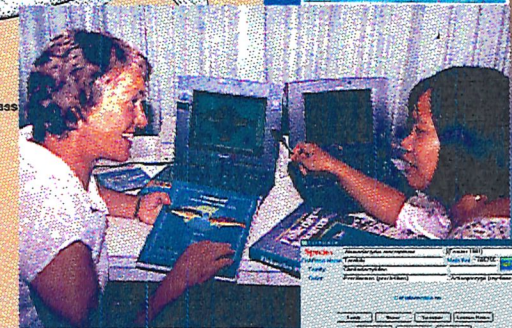
Jackass morwong.
Nemadactylus macropterus
(Bloch and Schneider)

Other common names include sea bream, Jackass fish, perch, silver perch, deepsea perch and mowie.
FAO: no known name
Australian species code: 377003

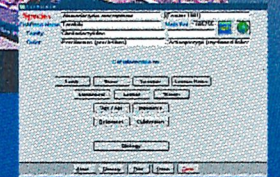
Grey morwong. *Nemadactylus douglasii* (Hector)

Other common names include rubberlip morwong, blue morwong, great perch and Douglas' morwong.
FAO: no known name
Australian species code: 377002

Family CHEILODACTYLIDAE



Grey morwong and a pale silvery blue and sometimes have a brownish tinge. They lack the dark band of jackass morwong.



<http://www.cgiar.org/iclarm/fishbase/index.htm>

Bureau of Resource Sciences
AUSTRALIA



FishBase on the World Wide Web.

(<http://www.fishbase.org/search.cfm>)

Some copies of graphics from the FishBase web site are provided below to illustrate the clarity and accessibility of the encyclopedia. There is also an example of an edited print-out of a synopsis from FishBase for an AFR species—yellowfin bream. A new feature of FishBase shows a summary of this information in a Key Facts page, where users can replace default settings with their own estimates and recalculate several important life history and fisheries parameters, including yield-per-recruit analysis and estimation of optimum exploitation rate.

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**A Global Information System on
Fishes**

Welcome to the world of fishes. The purpose of this page is to give you background information on FishBase, a global information system with all you ever wanted to know about fishes.

FishBase is a relational database with fish information to cater to different professionals such as research scientists, fisheries managers, zoologists and many more. FishBase 98 is the 5th CD-ROM edition of FishBase and currently holds information for 20,000 species. Explore this page to get [more information](#) on FishBase, including a [demo](#) of screen shots and the complete [FishBase Book](#) (293 pages) with detailed description of concepts, design and data sources.



**FishBase 99 CD
available in
November**

FishBase 98...What's New!

The two main goals for FishBase 98 were to move from Microsoft Access 2.0 (16 bit) to Access 97 (32 bit) and to pass the 20,000 species threshold. Both goals were reached. Other major improvements are the inclusion of Eschmeyer's (1998) *Catalog of Fishes* databases ([references](#) to all original descriptions of fishes) and new graphs analyzing FAO catch data at the country level.

**Additional/new features of
FishBase 98 are:**

- now over 54,000 names (valid, synonyms, misspellings, misidentifications) sorted out for over 20,000 species;
- the classification of higher taxa now follows Eschmeyer (1998);
- new FAO catch data, 1950 to 1996;
- new FAO aquaculture data, 1984 to 1996;
- new FAO introductions data;
- 3,000 more pictures (total>15,000);
- 1,000 more references (total>12,000);
- a new Length-Length table with length conversions for about 2,000 species;
- 100 new recruitment time series, provided by R.A.Myers;
- presentation and analysis of trophic ecology have been substantially improved;
- new graphs and reports; and
- more data for more species.

FishBase was developed by the International Center for Living Aquatic Resources Management (ICLARM) in collaboration with the Food and Agriculture Organization of the United Nations (FAO) and many other partners, and with support from the European Commission (EC).

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Commission



Food and Agriculture
Organization of the
United
Nations

ICLARM

International Center for
Living Aquatic Resources
Management



California Academy of
Sciences



Muséum National d'Histoire
Naturelle



Consultative Group
on
International
Agricultural
Research



Africamuseum,
Tervuren

FishBase 99

(23,000 species, 40,000 synonyms, 80,000 common names, 16,000 Pictures, 16,000 References) (7/99)



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Common Name

(e.g. rainbow trout)
 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Scientific Name

Genus (e.g. Rhincodon)
Species (e.g. typus)
 Summary Key facts Eschmeyer
 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

To search without Genus, change Genus option "is" to "contains"

Glossary

(e.g. oophagy)
 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Information by Family

Species Summary for *Acanthopagrus australis* Surf bream



Acanthopagrus australis (Günther, 1859)

Family: Sparidae (Porgies) (not available)
Order: Perciformes (perch-likes)
Class: Actinopterygii (ray-finned fishes)
English name: Surf bream
Distribution: Southwest Pacific: endemic to eastern Australia, from Townsville in Queensland to the Gippsland Lakes in Victoria. Occurrence in Japan and Ryukyu Islands (Ref. 559) and Taiwan (Ref. 5193) need verification.
Biology: Common in coastal and estuarine rocky habitat. They enter rivers upstream to the limit of brackish waters. They migrate from their feeding to their spawning grounds; they spawn mainly during winter in the vicinity of river entrances; eggs are planktonic and hatch after 2.5 days. A portion of the population changes sex from male to female after spawning. They feed on mollusks, crustaceans, worms, fish and ascidians.
Max. size: 65.0 cm TL; max.weight: 4,500.0 g
Environment: demersal, brackish, marine
Climate Zone: subtropical; 19°s - 38°S
Importance: fisheries: commercial; aquaculture: never/rarely; gamefish
Status of threat: Not in IUCN Red List
Dangerous: harmless
Taxonomic Coordinator:
Main Ref: Kailola, P.J., M.J. Williams, P.C. Stewart, R.E. Reichelt, A. McNee and C. Grieve. 1993. (Ref. 6390)

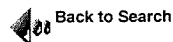
More information:	<u>Synonyms</u>	<u>FAO areas</u>	<u>Countries</u>
	<u>Key facts*</u>	<u>References</u>	<u>Collaborators</u>
	<u>Common names</u>	<u>Maturity</u>	<u>Growth</u>
	<u>Max. age & size</u>	<u>Occurrences</u>	<u>Spawning</u>
	<u>Reproduction</u>	<u>Eggs</u>	<u>Egg dev.</u>
<hr/>			
	<i>Checked: Luna, Susan M.</i>	<i>Modified: Luna, Susan M.</i>	<i>Entered: Torres, Armi G.</i>


Submit

 Ref.:
 (e.g. 9948)



Glossary

Submit

 (e.g. cephalopods)


List of Population Characteristics for <i>Acanthopagrus australis</i>					
[n=3] <input type="button" value="Sort by"/> <input checked="" type="radio"/> Country <input type="radio"/> Locality					
Sex of fish	Wmax (g)	Lmax (cm)	Tmax (y)	Country	Locality
<u>female</u>		39.0	12.0	Australia	eastern coasts
<u>male</u>		30.0	10.0	Australia	Tuggerah Lakes, New South Wales
<u>unsexed</u>	4000.0	65.0		Australia	western coasts
 Back to Search					

7 Common Names of <i>Acanthopagrus australis</i>		
Common Name	Used In	Language
<u>Black bream</u>	Australia	English
<u>Eastern black bream</u>	Australia	English
<u>Ôsutoraria-kichinu</u>	Japan	Japanese
<u>Sea bream</u>	Australia	English
<u>Silver bream</u>	Australia	English
<u>Surf bream</u>	USA	English
<u>Yellowfin bream</u>	Australia	English

 [Back to Search](#)  [Back to Top](#)

List of Growth Parameters for <i>Acanthopagrus australis</i> [n=1]
--

<u>Auximetric graph</u> (loading may take 2-3 min.) [n=1]
--

Median Record No. 1 L inf = 29.5 cm FL K = 0.5 Ref. 6055
--


No.	L _∞ (cm)	Length type	K (1/y)	to	Sex	M (1/y)	Temp. °C	Ø'	Country	Locality
1.	29.5	FL	0.510	-0.32				2.65	Australia	Moreton Bay, 1979-80

[⏪ Back to Search](#)

26 References for species <i>Acanthopagrus australis</i>	
Ref No.	Description
559	Masuda, H., K. Amaoka, C. Araga, T. Uyeno and T. Yoshino, 1984 The fishes of the Japanese Archipelago. Vol. 1 (text). Tokai University Press, Tokyo, Japan. 437 p. (text), 370 pls.
1817	Coleman, N., 1980 Australian Sea fishes. Doubleday Australia Pty. Ltd., N.S.W., Australia.
1830	Eschmeyer, W.N., 1990 Catalog of the genera of recent fishes. California Academy of Sciences, San Francisco, USA. 697 p.
4517	Hureau, J.-C., 1991 La base de données GICIM: Gestion informatisée des collections ichthyologiques du Muséum. p. 225-227. In Atlas Préliminaire des Poissons d'Eaux Douce de France. Conseil Supérieur de la Pêche, Ministère de l'Environnement, CEMAGREF et Muséum National d'Histoire Naturelle, Paris.
4537	Robins, C.R., R.M. Bailey, C.E. Bond, J.R. Brooker, E.A. Lachner, R.N. Lea and W.B. Scott, 1991 World fishes important to North Americans. Exclusive of species from the continental waters of the United States and Canada. Amer. Fish. Soc. Spec. Publ. (21):243 p.
4830	Berg, L.S., 1958 System der rezenten und fossilen Fischartigen und Fische. VEB Verlag der Wissenschaften, Berlin.
5193	Shen, S.C. (ed.), 1993 Fishes of Taiwan. Department of Zoology, National Taiwan University, Taipei. 960 p. (in Chinese).
5515	Anon., 1993 Computerized catalog of the fish collection. California Academy of Sciences, San Francisco, California.
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28266	Henry, G.W., 1983 Biology and fisheries of yellowfin bream <i>Acanthopagrus australis</i> (Teleostei: Sparidae) in Tuggerah Lakes, New South Wales. Unpublished MSc thesis, University of New South Wales. 130 p.
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Author:	Kailola, P.J., M.J. Williams, P.C. Stewart, R.E. Reichelt, A. McNee and C. Grieve
Year:	1993
Title:	Australian fisheries resources.
Source:	Bureau of Resource Sciences, Canberra, Australia. 422 p.
Reference No:	6390
Language:	English
Usage:	used in part

 [Back to Search](#)

FishBase
Full synopsis of biological data on
Surf bream
Acanthopagrus australis
(Günther 1859)
Sparidae

Yellowfin bream, *Acanthopagrus australis*

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Table of Contents

Topic	Page
How to use this synopsis	2
Family	3
Genera	4
Species	5
Synonyms	6
Common names	7
Countries	8
Stocks	9
Occurrences	10
Reproduction	11
Spawning	12
Maturity	13
Eggs	14
Egg development	15
Ecology	16
Food items	17
Population characteristics	18
Population growth	19
Bibliography	21
Acknowledgments	23

Some hints on how to use this synopsis

The following definitions are meant to help you better understand the way this synopsis presents information and document its sources.

Please refer to the FishBase book for more details; and do not hesitate to contact FishBase staff if you have suggestions or information that would improve the format or the contents of this synopsis.

- SpecCode : Numeric FishBase code, assigned to a species and used for internal purposes only.
- StockCode : Numeric FishBase code, assigned to the species in general, a wild population, or a cultured strain. Since, to date, only a few species have been separated into stocks, the StockCode usually refers to the species in general.
- MainRef. : Numeric FishBase code corresponding to the reference used as a source for most of the information within a table.
- Ref. : Numeric FishBase code corresponding to the reference associated with a specific entry or set of entries; when left empty, the source of information is the MainRef. Note that the references listed at the end of this synopsis are arranged according to their numeric codes, and not alphabetically.
- Empty fields : Imply information that is currently not available to the FishBase project and/or information which is available but which has not been entered as of 10-Mar-99 . Note that the character 0 (zero) is used as a valid numerical value, and does not indicate that no information is available.
- Choice fields : Much of the information in this synopsis was entered via multiple choice fields; the available alternatives must be considered when evaluating the wisdom of a given choice.
- Remarks or Comment fields : The free text included in such fields may have been taken verbatim from the source in "Ref.", in which case this should be regarded as a direct citation (but lacking quotation marks); alternatively, the text may have been modified/adapted from one or several sources. In the latter case, additional "Ref." numbers may be incorporated in the text.

Note : The table of Contents is at the end of this synopsis.

Summary information on the family Sparidae

Family : Sparidae (Porgies)
Order : Perciformes (perch-likes)
Class : Actinopterygii (ray-finned fishes)

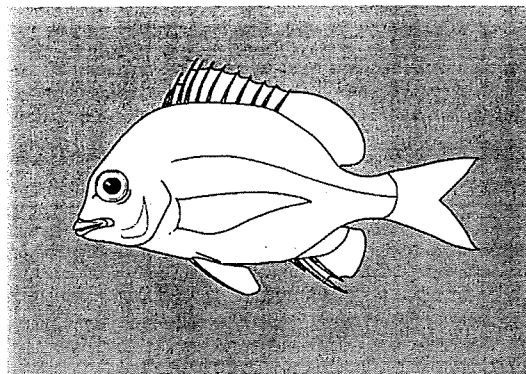
MainRef. : 007463
FamCode : 330

Number of species : 112

Occurs in : Marine
 Brackish
 Freshwater

Aquarium fishes : some

First fossil record : lower Tertiary
lower Eocene
Ref. : 004830



Number of valid genera : 35 (after Eschmeyer, 1990 (Ref. 001830))

Species currently in FishBase : 119 (Including subspecies) complete : Yes

Remarks Chiefly marine; very rare in fresh- and brackish water. Distribution: tropical and temperate Atlantic, Indian and Pacific Oceans. Dorsal fin usually having 10-13 spines; soft rays 10-15. Three spines in anal fin; soft rays 8-14. Maxilla hidden by a sheath when mouth is closed. Branchiostegal rays 6. Vertebrae 24 (10 + 14). To about 1.2 m maximum length. Many species have been found to be hermaphroditic; some have male and female gonads simultaneously; others change sex as they get larger. Premier food and game fishes. Many species around southern Africa. A few species have been implicated in cases of ciguatera (Ref. 4537).

Information on the genus <i>Acanthopagrus</i> and its synonyms, after Eschmeyer 1998 (Ref. 26282)
--

<i>Acanthopagrus</i>	Status : valid	Gender : masculine
Peters, 1855, p. 242, CAS Ref: 13448		
Type by monotypy.		
Type species : <i>Chrysophris vagus</i>	Peters, 1852	
Current genus: <i>Acanthopagrus</i>		

<i>Datnia</i>	Status : synonym	Gender : feminine
Cuvier, 1829, p. 148, CAS Ref: 995		
Type by absolute tautonymy.		
Type species : <i>Coius datnia</i>	Hamilton, 1822	
Current genus: <i>Acanthopagrus</i>		

<i>Mylio</i>	Status : not available	Gender : masculine
Commerson in Lacepède, 1802, p. 131 (footnote), CAS Ref: 4929		
Type by monotypy (also designated)		
Type species : <i>Chaetodon bifasciatus</i>	Forsskål, 1775	
Current genus: <i>Acanthopagrus</i>		

Total = 3

General information on *Acanthopagrus australis*

Classification

Class : Actinopterygii (ray-finned fishes) MainRef. : 006390
 Order : Perciformes (perch-likes)
 Family : Sparidae (Porgies)
 Subfamily :
 Species : *Acanthopagrus australis*
 Author : (Günther 1859) Author Ref. :

Environment

Freshwater : No Habitat : demersal
 Brackish : Yes Migrations :
 Saltwater : Yes Depth range : 1 to 25 m

Importance

Landing statistics : Ref. : 006390
 Main source of landing :
 Importance to fisheries : commercial Moreton Bay, Queensland and NWS.
 Main catching method : gillnets unspecified gill nets (GN)
 Other methods : Seines Gillnets Castnets Traps Spears
 Trawls Dredges Liftnets Hooks+Lines Other

Used for aquaculture : never/rarely Ref. :
 Used as bait : never/rarely Ref. :
 Aquarium fish : never/rarely Ref. :
 Game fish : Yes Ref. : 006390
 Dangerous fish : harmless Ref. :
 Electrobiology : no special ability Ref. :

Size and age

Longevity (y) (wild) : 12 F 10 Male Ref. : 006390
 (y) (captive) : Ref. :
 Maximum length (cm) (male/unsexed) : ~~39~~ 30 FL (female : 39 FL) Ref. : 006390
 Common length (cm) (male/unsexed) : (female : Ref. :
 Maximum weight (g) (male/unsexed) : 4,500.00 (female : Ref. : 006390

Remarks

Inhabit rocky reefs, ~~coral~~ ^{no} reefs, sandy bottoms and seagrass meadows from 1 to 25 m depth. They enter rivers upstream to the limit of brackish waters. They migrate from their feeding to their spawning grounds; they spawn mainly during winter in the vicinity of river entrances; eggs are planktonic and hatch after 2.5 days. A portion of the population changes sex from male to female after spawning. They feed on mollusks, crustaceans, worms, fish and ascidians.

reference ?

Synonyms, misidentifications, etc. used for *Acanthopagrus australis*

<u>Synonym</u>	<u>Author</u>	<u>Status</u>	<u>Ref.</u>
<i>Roughleyia australis</i>	(Günther 1859)	new combination	026282
<i>Chrysophrys australis</i>	Günther 1859	original combination	026282
<i>Acanthopagrus australis</i>	(Günther 1859)	new combination	006390

Total = 3

Common names for *Acanthopagrus australis*

<u>Name</u>	<u>Language</u>	<u>Country</u>	<u>Ref.</u>
Black bream ✓	English	Australia	006390
Eastern black bream ✓	English	Australia	006390
Ôsutoraria-kichinu	Japanese	Japan	000559
Sea bream ✓	English	Australia	006390
Silver bream ✓	English	Australia	006390
Surf bream	English	USA (contiguous states)	004537
Yellowfin bream ✓	English	Australia	012964

Total = 7

Keenly & Brown (1994, p. 7): separate stocks for each estuary.

Distribution of *Acanthopagrus australis*

MainRef. 006390

Southwest Pacific: endemic to eastern Australia, from Townsville in Queensland to the Gippsland Lakes in Victoria. Occurrence in Japan and Ryukyu Islands (Ref. 559) and Taiwan (Ref. 5193) need verification.

Latitudinal range: 19° S - 38° S Temperature range: - °C Ref.:

Status of threat: NL.

<u>Country</u>	<u>Status</u>	<u>Ref.</u>
Australia	endemic	006390

Inhabit coastal and estuarine waters of eastern Australia from Townsville in Queensland to the Gippsland Lakes in Victoria (Ref. 28263).

Stock structure: The stock structure of yellowfin bream is uncertain. It has been proposed that separate stocks of this species exists for each estuary (Ref. 28261). However, tagging of yellowfin bream in northern New South Wales by NSW Fisheries had confirmed that some fish migrate considerable distances. These results indicated that a single stock of yellowfin bream exists.

Commercial fishery: The yellowfin bream fishery extends from Bundaberg in Queensland to Bermagui on the south coast of New South Wales. Most of the catch is taken from estuarine waters. The most important estuaries in New South Wales are Clarence River, Port Stephens, Lake Macquarie, Tuggerah Lakes and Botany Bay. In Queensland almost half of the yellowfin bream catch is taken from Moreton Bay (Ref. 28267). Yellowfin bream are caught throughout the year but catches are greatest during autumn and winter.

Tunnel nets are the main gear used to catch yellowfin bream in Queensland, and some catch is taken with gillnets. In New South Wales gillnets and haul seines are the most common gear used (Ref. 26523). Traps are employed in the lower regions of some estuaries and beach seines are sometimes used from ocean beaches. Fishing in estuaries is normally carried out at night (Ref. 26523). Small quantities of yellowfin bream sometimes form a bycatch of inshore trawling and trapping.

Yellowfin bream are sold exclusively on domestic fresh fish markets. They are normally sold as whole chilled product.

Recreational fishery: Yellowfin bream are one of the most popular angling species in estuaries and from ocean beaches and headlands in southern Queensland and New South Wales. The recreational catch of yellowfin bream by southern Queensland anglers exceeds the commercial catch for that State (Ref. 27635).

Surveys in northern New South Wales rivers by NSW Fisheries have also shown higher catches by recreational catches.

Yellowfin bream are caught mainly with baited rod-and-line or handline. Live yabbies (@*Callinassa australiensis*), beachworms (Onuphidae), crabs and fresh baits of prawns, pipis, fish flesh or whole small fish are used to catch yellowfin bream.

The Australian Anglers Association record for yellowfin bream is 4.5 kg for a fish caught in New South Wales in 1984.

Resource status: The New South Wales and Queensland yellowfin bream stocks are probably fully exploited, yet population levels appear to be stable. Environmental and habitat changes in southern Australian estuaries as well as increased fishing effort by recreational anglers are likely to have an important influence on future population levels of this species.

Japan	questionable	000559
Ryukyu Islands	questionable	000559
Reported from Okinawajima.		
Taiwan	questionable	005193

Total native = 0

Total introduced = 0

Yellowfin bream made up ~66% of catch by the Lismore Fishing Club between 1971 and 1993 (Gartside et al, 1999, p.51)

Catch rates for the Lismore Fishing Club have declined in the 18 years to 1993 (Gartside et al, 1999, p.56)

In Qld - a declining trend in total catch & increase in catch rate. Also, targeting of spawning schools by fishers, & coastal developments have reduced suitable spawning and feeding habitats.

FishBase 10-Mar-99

Williams 1997, p. 35

Summary information (no. of records) available for *Acanthopagrus australis*

Level: species in general

StockCode: 008419

MainRef.: 006390

Southwest Pacific: endemic to eastern Australia, from Townsville in Queensland to the Gippsland Lakes in Victoria. Occurrence in Japan and Ryukyu Islands (Ref. 559) and Taiwan (Ref. 5193) need verification.

Ecology	: 1	Max. sizes	: 2	Strains	: 0
Food Items	: 5	FAO catches	: 0	Diseases	: 0
Food consumption	: 0	Genetics	: 0	Ciguatera	: 0
Diet composition	: 0	Allele frequency	: 0	Ecotoxicology	: 0
Ration	: 0	Heritability	: 0	Metabolism	: 0
Predators	: 0	Reproduction	: 1	Gill area	: 0
Morphology	: 0	Spawning	: 1	Swimming Type	: 0
Processing	: 0	Eggs	: 1	Swimming speed	: 0
Growth/mortality	: 1	Egg dev't.	: 1	Vision	: 0
Maturity	: 2	Larvae	: 0	Brains	: 0
Recruitment	: 0	Larval dynamics	: 0	Introductions	: 0
L/W relat.	: 0	Aquaculture	: 0	Occurrence	: 13

Total = 1

see : Rowland (1984) for genetic info. + hybridisation occurrence.

+ see: "Seafood the good food" extract.

Occurrence records for *Acanthopagrus australis*

Australia (008419)

(Cat. no.: CAS 109175)		Ref. : 005515
(Cat. no.: CAS 113048)		Ref. : 005515
(Cat. no.: CAS 120977)		Ref. : 005515
(Cat. no.: MNHN a-5623), Norman 1877	Castelnau	Ref. : 004517

Indian Ocean, Eastern

Australia (008419)

(Cat. no.: MNHN a-5119), Melbourne 1879 37° 55' S 144° 48' E	Castelnau	Ref. : 004517
(Cat. no.: MNHN 0000-4876), Melbourne 1868 37° 55' S 144° 48' E	Moore	Ref. : 004517
(Cat. no.: MNHN 0000-4875), Melbourne 1868 37° 55' S 144° 48' E	Moore	Ref. : 004517
(Cat. no.: MNHN 0000-4874), Melbourne 37° 55' S 144° 48' E	Moore	Ref. : 004517
(Cat. no.: MNHN a-0722), no locality given 1877 25° S 100° E	Castelnau	Ref. : 004517
(Cat. no.: MNHN 0000-9172), no locality given 1875 25° S 100° E	Castelnau	Ref. : 004517

Pacific, Western Central

Australia (008419)

(Cat. no.: MNHN 1978-0568), Diggers Camp 1970 29° 53' S 153° 18' E	Paxton	Ref. : 004517
(Cat. no.: MNHN 1978-0564), Diggers Camp 1970 29° 53' S 153° 18' E	Paxton	Ref. : 004517

Pacific, Southwest

Australia (008419)

(Cat. no.: MNHN a-1205), Port Jackson 1879 33° 35' S 151° 20' E	Castelnau	Ref. : 004517
--	-----------	---------------

Total = 13

General information on the reproduction of *Acanthopagrus australis*

Level : species in general,

StockCode : 008419

MainRef : 006390

Mode and Type of Reproduction

Mode : protandry

Fertilization : external

Spawning frequency :

Batch spawner : No

Ref. :

Reproductive guild :

A proportion of the population change sex from male to female after their first spawning season (Ref. 6390). Other fish remain functional males throughout their life and another small proportion develop directly into females at the age of 4 years (Ref. 27246, 28262). Also Ref. 28504.

Total = 1

→ Kerby & Brown, 1994, p.1

Spawning Information for *Acanthopagrus australis*

Locality : Australia , Moreton Bay, 1979-80
 Season (% of mature females; 111 = presence of mature females):
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 (11) 111 111
 Stockcode: 008419
 Main Ref. : 006055
 Data Ref.:
 Temp.: - °C

Fecundity: min (n) Female size: (g) (cm) Ref.
 max (n) (g) (cm)

Relative Fec. : - Ref. : Sex Ratio : % Ref.

Fecundity/length relationship ($F = a * L^b$):
 Length : - (cm) n : a : b : r :

Daily spawning frequency: - Ref.

Comment: Yellowfin bream spawn mainly during winter (Ref. 27246, 6055, 27245) but there can be considerable variation in spawning season between estuaries and between years (Ref. 6390). Spawning may commence as early as late autumn in southern and central New South Wales (Ref. 28261).

Total = 1

Williams, 1997: 36
 Fecundity : 300,000 to 3 million eggs from a single spawning.

Munro (1944, cited in Kerby & Brown 1994): 270,000 to 3 million eggs.

(Kerby & Brown, 1994)
 Spawning migration : may move up to 90km, (w. average distance of 50-60km)

Maturity data for *Acanthopagrus australis*

Locality : Australia, Botany Bay, New South Wales StockCode : 008419
 Sex : female 008109 Main Ref. : 006390
 Length at first maturity (cm) : 24 - ✓ Lm : FL Ref. :
 Age at first maturity (years) : 4 - ✓ tm : Ref. : 027245
 Comment :

Locality : Australia, Botany Bay, New South Wales StockCode : 008419
 Sex : male 008109 Main Ref. : 006390
 Length at first maturity (cm) : - Lm : Ref. :
 Age at first maturity (years) : 3 - ✓ tm : Ref. : 027245
 Comment :

Total = 2

Qld: females mature at 21 cm FL — Williams, 1997, p. 36.

Thorogood (1991) cited in Kerley & Brown, 1994:

Moreton Bay, males: - GSI increased in March, rose sharply in May, peaked in late June
 (Qld) & ♀♀

: Water temperature = an important environmental cue (mature as water temp. ↓)

Kerley & Brown
 1994
 p. 3

Most juvenile fish become functional males by 2 years of age.
 - larger fish usually females

Available information on eggs of *Acanthopagrus australis*

Level : species in general StockCode : 008419 Main Ref.: 006390

Water parameters with reported egg occurrences

	Temp. (°C)	Depth (m)	Salinity (ppt)	pH	Oxygen (mg/l)
max					
min					
mod					

Remarks: Ref.:

Descriptive characters

Place of development : buoyant (pelagic) ✓
 Shape of egg : Pic :
 Attributes :
 Color of egg : Color of oil globule :

Meristic and metric (mm) characters

	max	Ref.	min	Ref.	mod	Ref.
Oil globules						
Oil diameter						
Egg diameter						
Reference diameter (RD)						

	max	min	mod
Perivitelline width (% RD)			
Chorion thickness (% RD)			

Additional characters

Entered : 02 04/03/99 Modified : 04/03/99 Checked :

Williams, 1997, p. 36

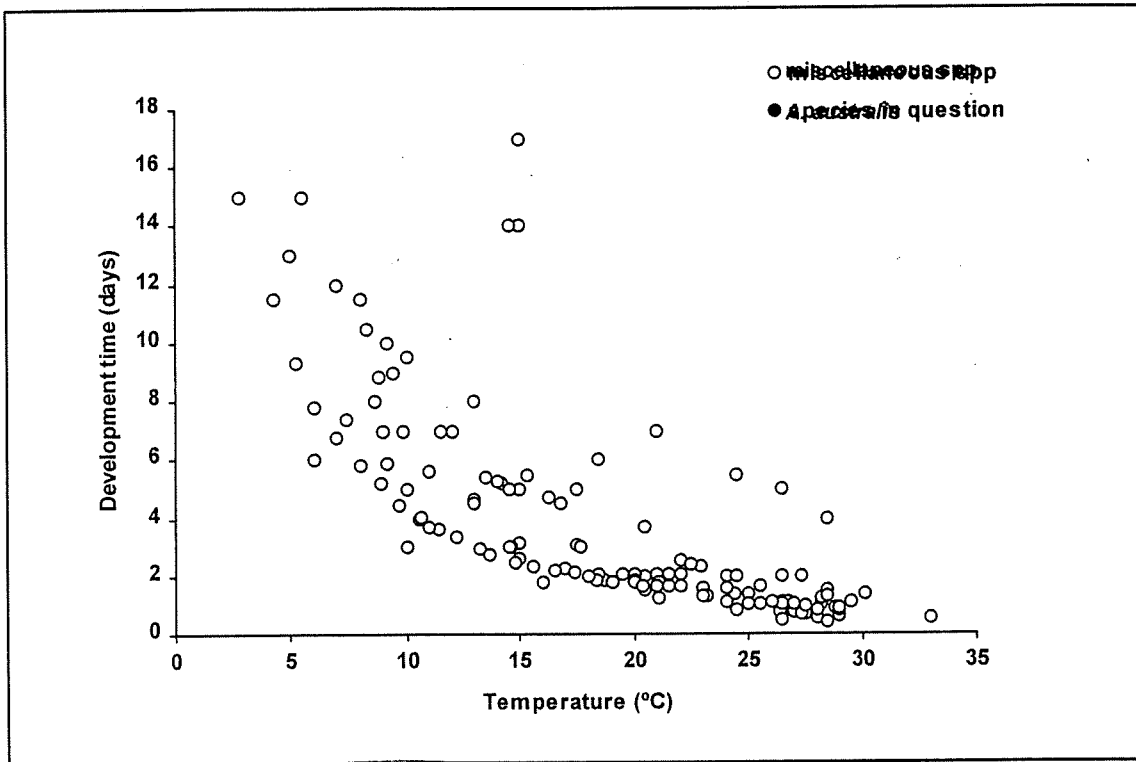
Larvae (Qld) : - planktonic
 - after about 4 weeks the fry enter estuaries at night on a full moon and settle at about 14mm length.

Egg development time for *Acanthopagrus australis*

Locality : Australia , eastern coasts (StockCode: 008419)
 Temperature : °C Salinity : (ppt) Ref. : 006390
 Egg diameter : (mm) Egg development time : 2.50 (d) ✓ Ref. :
 Data Type : Remarks :

Total = 1

Relative egg development time of *Acanthopagrus australis*



Note that only the black dot(s) refer to this species.

Where is the black dot?

Ecology of *Acanthopagrus australis*

Level : species in general StockCode : 008419 008109 Main Ref. : 006390

Habitats Ref. : 006390

Streams : No Lakes : No Caves : No (exclusively : No)

Estuaries/lagoons/brackish seas : Yes

Intertidal : Yes ✓ soft : Yes ✓ rocky : Yes ✓ mangroves/marshes/swamps : No

Marine : Yes oceanic : No neritic : Yes coral reefs : ~~Yes~~ No
 soft bottom : No hard bottom : No seagrass beds : No macrophyte : No

Rocky reefs: yes

Food Ref. : 006390
 Main Food : zoobenthos

Herbivory : mainly animals (trop Ref. : 006390

Feeding Type : hunting macrofauna (predator) Ref. : 006390

Additional remarks

Yellowfin bream are most abundant in estuaries but also inhabit inshore reefs and waters adjacent to ocean beaches and rocky headlands (Ref. 6390). They live in rivers upstream to the limit of brackish waters but rarely enter fresh waters (Ref. 6390). Postlarvae and juveniles mainly inhabit seagrass beds in shallow estuarine areas (Ref. 27246).

Adults migrate from their feeding grounds to the spawning site (Ref. 6390). All mature male fish undertake the spawning migration but the proportion of mature females migrating to spawn increases as they age (Ref. 28262).

Between June & March of each year, *A. australis* juveniles are very abundant over seagrass (*Zostera capricorni*) beds in Botany Bay, NSW. (McNeill et al, 1992).

Food items reported for *Acanthopagrus australis*

Level: species in general

StockCode : 008419

Food item				Ref.
nekton				
finfish	bony fish ✓	unidentified	unidentified	006390
zoobenthos				
benth. crust.	crabs ✓	unidentified	unidentified	006390
	shrimps/prawns ✓	Penaeidae	unidentified	006390
mollusks	bivalves ✓	Donacidae	✓ Plebidonax deltoides	006390
		Ostreidae	✓ unidentified	006390

Total = 5

Morton, Pollock, Beumer (1987):

Moreton Bay, Qld.

grapsid crabs - 70% of diet

Macrobrachium australiense

Laomedva healyi

penaeid prawns

gastropods

Onchidiidae

benthic organisms

Surface feeding prevalent in summer & autumn

→ flying insects (N. nervosa australiensis,
odonatans
hymenopterans

dipterans

grasshoppers (O. Orthoptera)

spiders (Dolomedes spp)

skink lizards (Lampropholis delicata)

detritus.

Maximum weight/length/age of *Acanthopagrus australis*

Locality : Australia, Tuggerah Lakes, New South Wales StockCode : 008419
 Max weight (g) : Ref. : 006390
 Max length (cm) : 30 FL ✓ Same specimen for WL : No Sex : male
 Max age (yrs) : 10 ✓ Same specimen for LT : No
 Comment :

Locality : Australia, eastern coasts StockCode : 008419
 Max weight (g) : Ref. : 006390
 Max length (cm) : 39 FL ✓ Same specimen for WL : No Sex : female
 Max age (yrs) : 12 ✓ Same specimen for LT : No
 Comment :

Total = 2

Growth rates (Tuggerah Lakes):

age 1 - 13 cm FL
 age 2 - 18 cm FL
 age 3 - 23 cm

Ref. 6390
 also ref 28266

Kerby & Brown, 1944:5

Munro 1944

Dredge 1976

Pollock 1982

Henry 1983

Age 1

Age 2

Age 3

Age 4

7 cm

11 cm

15 cm

19 cm

7.6 cm

12.2 cm

15.8 cm

18.4 cm

14.5 cm

20.5 cm

24 cm

13 cm

18 cm

23 cm

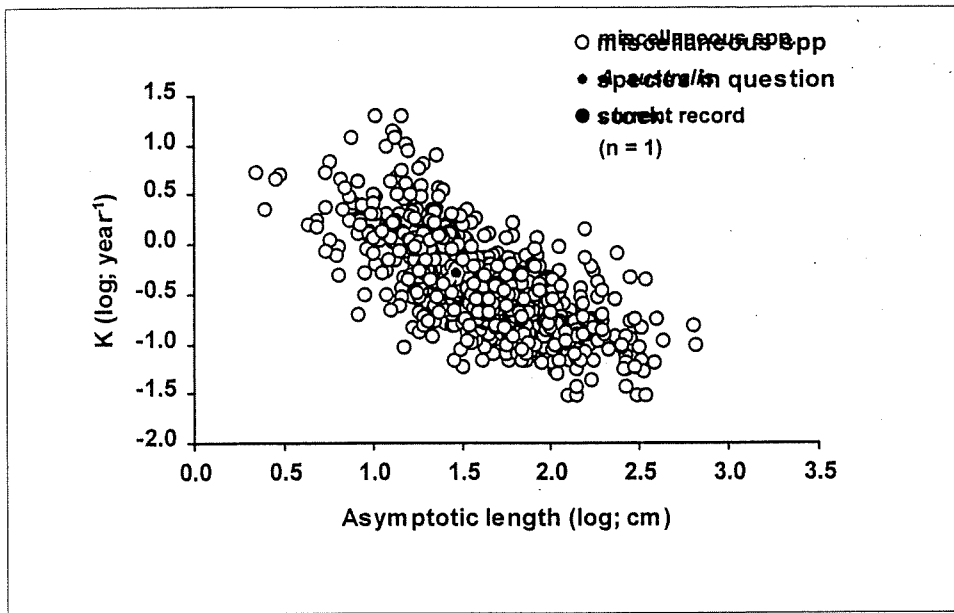
Growth and mortality of *Acanthopagrus australis*

<u>Country</u>	<u>L_∞ (cm)</u>	<u>W_∞ (g)</u>	<u>K (/year)</u>	<u>t₀ (y)</u>	<u>Sex</u>	<u>Ref.</u>
Australia	29.5 FL		0.51	-0.32	unsexed	006055
Total = 1 (See FishBase for more details.)						

L_{∞} 28cm FL (Dredge) 1976
 29.5cm $K=0.51$ (Pollock 1982)

] Kerby
 & Brown
 1994
 p.5

K vs L infinity in *Acanthopagrus australis*



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Total : 23

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