



## Annual distribution of anchovy lineage

**FD0060\_1; FD0061\_1; FD0062\_2; FD0063\_2; FD0064\_2**

1. Electronic databases were used to generate initial maps of species distribution.
  - a. Commercial fishing returns (larger vessels): **TCEPR** database. All records from 1 October 1989 to 30 September 2005 were extracted on 17 October 2005. Data were used to estimate mean annual catch and catch rate (kilograms per kilometre towed) in 0.25 degree rectangles. Only the top five species caught are reported on these forms so information on the absence of a species is not available. No catches are reported from the main (north-east) region of known anchovy distribution. The few records of anchovy (species code ANC) from Mernoo Bank are plausible, given the occurrence of the species at the Chatham Islands, but they are not supported by any other records in this area.
  - b. Commercial fishing returns (smaller vessels): **CELR** database. All records from 1 October 1989 to 30 June 2003 were extracted on 15–17 July 2003. Data were used to estimate mean annual catch in statistical areas. Information from statistical areas 1–10 was down-weighted because of likely mis-recording of Fishstock instead of statistical area. Only the top five species caught are reported on these forms so information on the absence of a species is not available. The records showing the main catches of anchovy centred on outer Hauraki Gulf and extending from Ninety-mile Beach to Cape Runaway, with smaller catches in the Marlborough Sounds, are considered reliable.
  - c. Research bottom trawl records: **fish\_comm** database. This database is a groomed version of the research trawl database **trawl**. All records from 2 September 1978 to 30 September 2005 were extracted on 19 May 2006. Data were used to estimate total catch, proportion of tows that caught the species, and catch rate (kilograms per kilometre towed) in 0.25 degree rectangles. Anchovy records are considered reliable; they are restricted to shallow coastal waters around the North Island and the north and north-west of the South Island.
  - d. Museum of New Zealand Te Papa records of this species based on voucher specimens held in their collection were searched for distributional information that added to the distributional ranges determined from other databases.
  - e. Databases of commercial tuna longline catches (**TLCER**), observer records from tuna longlines (**I\_line**), aerial sightings (**aer\_sight**) and recreational fishing (**rec\_data**) were not used as they contained no records of this species, or the number of records was too small to provide useful additional distributional information.

Scientific observer records from larger vessels: **obs** database had no useful information. Records from Russian trawl surveys (**trawl**) were not used because they were historic (pre 1987), and species identification is regarded as unreliable.

2. Literature sources were searched for distributional information that added to the distributional ranges determined from databases.
  - a. Unpublished electronic bibliography of New Zealand fishes compiled by L. J. Paul and held on a NIWA computer.
  - b. Aquatic Sciences and Fisheries Abstracts.
  - c. *New Zealand Professional Fisherman* and *Seafood New Zealand* for 1986–2002.
  - d. *New Zealand Fishing News* for 1998–2002.
  - e. Scientific papers, unpublished reports and university theses available to the expert who prepared the distributional layers.

3. Other sources.
  - a. Nil.

#### 4. Summary

- a. Maps generated from the electronic databases were provided to an expert scientist who integrated this information with other information from the literature, and expert opinion, and produced hand-drawn distributional zones on a template map containing depth contours at 250 m, 500 m, and 1000 m. These maps were then digitised and imported into a GIS software package as layers. The areas of the zones were calculated, and the layers were linked to attribute and metadata files.
- b. The primary sources of distributional data for anchovy were the CELR and fish\_comm databases, and published records.
- c. Anchovy occur around most of mainland New Zealand, but are apparently absent from the Otago, and Southland coasts (Whitehead et al. 1988, Paul 2000). They are also present around the southern two-thirds of Australia (McNee 1993), and occur at some mid-Tasman Islands (Francis 1993). There are no records from the Chatham Islands. Anchovy are a coastal pelagic species; they usually occur at the surface or in midwater where the water is less than 100 m deep, but are not constrained by seafloor depth.

#### 5. References

The following sources provided useful information on the distribution of this species. This is not an exhaustive list of all references to the species.

Francis, M.P. (1993). Checklist of the coastal fishes of Lord Howe, Norfolk, and Kermadec Islands, Southwest Pacific Ocean. *Pacific Science* 47(2): 136-170.

McNee, A. (1993). Anchovy. pp. 205–206 In Kailola, P.J. et al. (comps), Australian Fisheries Resources. Bureau of Resource Sciences and Fisheries Research and Development Corporation, Canberra.

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- Paul, L.J. (2000). New Zealand fishes. Identification, natural history & fisheries. Reed Books, Auckland. Revised edition. 253 p.
- Robertson, D.A. (1978). Blue mackerel, pilchard, anchovy, sprat, saury, and lanternfish. pp. 85–89 In Habib, G.; Roberts, P.E. (comps.), Proceedings of the Pelagic Fisheries Conference July 1977.
- Whitehead, P.J.P.; Nelson, G.J.; Wongratana, T. (1988). Clupeoid fishes of the world (Suborder Clupeoidei). Part 2. Engraulididae. FAO Fisheries Synopsis No. 125, Vol. 7(2): 305-579.