NIWA

Taihoro Nukurangi

Paua shell length information from catches in PAU 2–4, 5A, 5B, 5D and 7 in 2001–02

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Final Research Report for
Ministry of Fisheries Research Project PAU 2001-01
Objective 1

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Report Title: Paua shell length information from catches in PAU 2–4, 5A, 5B, 5D and 7 in 2001–02

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7. Executive Summary

The measurement of landed paua shells from the commercial catch (paua market sampling) began in June 1990 and continued until 1994. Paua market sampling was re-instigated in PAU 5B, PAU 5D, and PAU 7 in 1997 to contribute data to the 1998–1999 length based population model stock assessments in those areas. From the 1999–2000 fishing year the programme was expanded to include sampling from all major Quota Management Areas (QMAs) where commercial landings of paua were made. These data are summarised by Fisher and Banks (1991, 1995); and Andrew et al. (2000, 2001).

This reports summarises the basal shell length information collected from paua fishery areas PAU 2, PAU 3, PAU 4, PAU 5A, PAU 5B, PAU 5D, and PAU 7 during the 2001–2002 fishing year. A total of 38 176 paua were measured from 267 samples.

The basal length frequency distributions were typical of commercial paua fisheries. In all areas except PAU 7, a wide size range of shells were measured, although few were larger than 160 mm. The basal length frequency distribution for PAU 7 indicated

heavy fishing of newly recruited paua. This has been a consistent pattern in the PAU 7 QMA since paua market sampling began (Andrew et al 2000). The basal length frequency distributions from all other QMAs are similarly consistent over time.

8. Objectives

1. To continue paua market sampling to estimate the size frequency distribution of the commercial catch of paua in PAU 2, PAU 3, PAU 4, PAU 5A, PAU 5B, PAU 5D and PAU 7 in the 2001/2002 fishing year.

9. Introduction

A stock monitoring programme to sample the landed commercial fish catch in New Zealand was established by MAF Fisheries in 1989. The programme primarily involved the collection of data on hoki and orange roughy, but in June 1990 it was expanded to include a number of other species, including paua (Fisher and Banks 1991). Market sampling of paua was done on a monthly basis in PAU 7, PAU 5A, PAU 5B and PAU 5D. The programme was suspended in July 1994 (Fisher and Banks 1995).

In December 1997, market sampling of landed paua shell was re-established in PAU 7, PAU 5A, PAU 5B and PAU 5D to contribute data to the 1998–1999 length based stock assessment model analyses. From the 1999–2000 fishing year onwards, the programme was expanded to include sampling from all QMAs (i.e., PAU 2, PAU 3, PAU 4, PAU 5A, PAU 5B, PAU 5D and PAU 7) where there were significant landings of commercial paua.

The number of samples and shells measured are presented in Table 1 (based on data stored on the NIWA market sampling data base).

Table 1: Summary of paua data recorded on the NIWA Market sampling data base.

Fishing year	Number of samples	Number of shells measured	PAU QMAs sampled
1989-1990	8	4726	PAU 7
1990-1991	31	12 678	PAU 7
1991-1992	111	39 278	PAU 5A,5B,5D,7
1992-1993	106	35 748	PAU 5A,5B,5D,7
1993-1994	90	29 364	PAU 5A,5B,5D,7
1997-1998	39	4 913	PAU 5A,5B,5D,7
1998-1999	86	10 430	PAU 2,4,5A,5B,5D,7
1999-2000	261	31 911	PAU 2,3,4,5A,5B,5D,7
2000-2001	274	38 400	PAU 2,3,4,5A,5B,5D,7
2000-2002	267	38 176	PAU 2,3,4,5A,5B,5D,7

10. Methods

Sampling was done in processing sheds at Masterton (PAU 2), Blenheim and Ward (PAU 3 and PAU 7), Chatham Islands (PAU 4), Christchurch (PAU 5A, PAU 5D), Dunedin (PAU 5A, PAU 5D), Bluff (PAU 5A, PAU 5B, PAU 5D) and Horseshoe Bay, Stewart Island (PAU 5B). PAU 1 and PAU 6 are not sampled because both have nominal TACCs of less than 1 t.

Sampling was carried out between October and July to ensure sampling over the period of greatest catch. Data was collected as soon as possible after the start of the fishing year. Because paua fishing activity is largely dictated by weather conditions and market demand, sampling at regular intervals during the season is not possible.

A sample is a single days landing from a diver that could be identified with details of date, diver, total landing weight and CELR fine scale zone information from where paua were gathered. Samples were haphazardly selected on an *ad hoc* basis and without regard to any specific diver or location of fishing.

For each diver landing sampled, a bag of unsorted shucked shells was set aside and labelled to record the diver, the date and location of the catch, and the total weight of paua landed by the diver on the day. Approximately 100 or more undamaged shells from each bag were randomly selected, and the longest basal length of each shell was measured to the nearest millimetre with vernier callipers.

Basal length is the longest measurement along the anterior-posterior axis of the shell lip (as defined by the limit of the shell nacre when viewed with the shell upside down). Basal length is used to measure the population size structure of paua in NIWA independent timed swim surveys which are also used in the paua stock assessment model.

Basal length is not the same as total length (longest measurement along the anterior-posterior axis) used to define minimum legal size (125 mm). The issue of legal size length in paua is being examined with a selectivity curve model to determine the number of legal size recruits (2003 stock assessment of PAU 7 – paper in prep. Breen and Kim).

Basal length data was grouped into 2 mm size classes for presentation. Paua 170 mm or longer, were pooled into a single size class. The number of paua exceeding 170 mm ranged from about 0.47% in PAU 5B to 0.02% in PAU 2.

A target of 40 samples was set for each PAU management zone. However, a minimum of 30 diver days (Andrew et al., 2001) were required from each QMA to provide robust information for analysis.

In previous publications (Andrew et al., 2001) basal length-frequency data was scaled up to the size of the sampled catch by dividing the sample size by the proportion of the catch sampled. Because paua catches usually consist of many small landings, the number of shells measured are a relatively large proportion of the catch(10%–100%). The scaled data for paua is therefore not significantly different from the raw data (S. Kim, pers. comm.) and raw data is now used in the paua stock assessment model.

11. Results

11.1 Paua Market Sampling

The number of samples recorded for each QMA in the 2001–2002 fishing year and the number of shells measured are shown in Table 2.

Table 2: Summary of data recorded per fishing zone for the 2000–2001 fishing year.

QMA	Number of samples	Number of shells measured
PAU 2	35	4 446
PAU 3	34	6 892
PAU 4	33	3 781
PAU 5A	44	5 130
PAU 5B	37	4 193
PAU 5D	47	5 795
PAU 7	37	7 939
Total	267	38 176

Basal length frequency distributions for the 2001–2002 fishing year, for PAU 2, 3, 4, and 7; and for PAU 5A, 5B, and 5D are shown in Figure 1. In some areas, shell overhang may increase the length of the shell by up to 10 mm, and may account for the observed numbers of apparently sub legal paua present in basal length frequency distributions (Figure 1).

12. Conclusions

Basal length frequencies of paua from samples of the commercial catch are available between 1990 and 1994 and from 1999 onwards. The basal length structure of the commercial catch for the period reported in this paper appears to be similar to data recorded in previous years (Andrew et al. 2000, Andrew et al. 2001). The mode of the basal length frequencies for all QMAs shows that a broad range of paua lengths are landed with the exception of PAU 7. In PAU 7 the mode of the distributions remains near the MLS (125 mm) for the fishery. The target of 40 samples for each PAU management zone was only achieved for data from PAU 5A and 5D. However, the minimum of 30 diver days (Andrew et al., 2001) were exceeded for the remaining QMAs.

13. Publications

None.

14. Data Storage

Data sheets are stored in a secure area on site at NIWA, Greta Point Wellington. The data is also stored electronically on the Ministry of Fisheries Market Data base and managed by NIWA (Fisher and Mackay 2000).

15. References

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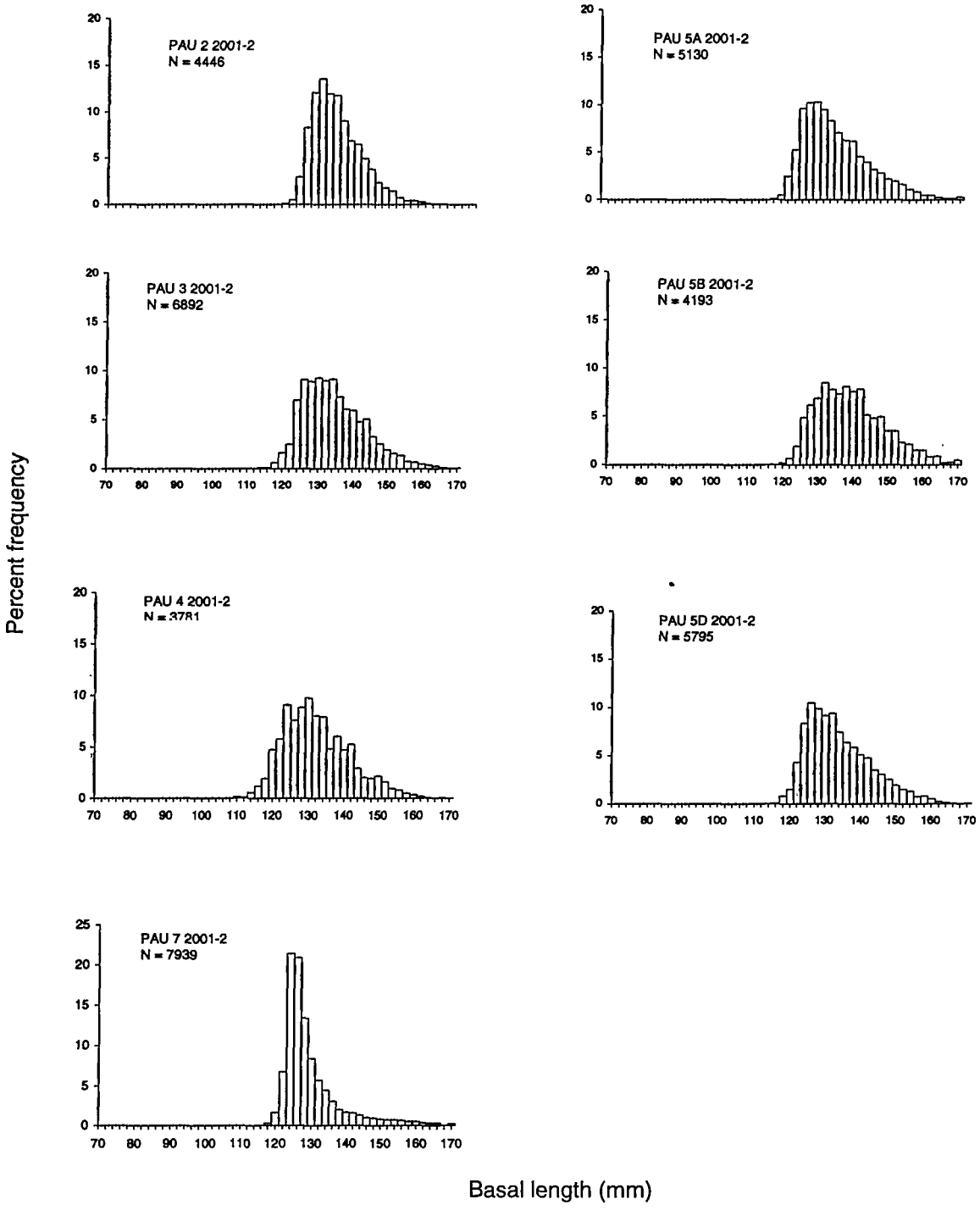

Figure 1: Basal length frequency distributions of *H iris* from paua market sampling in PAU 2, PAU 3, PAU 4, PAU 5A, PAU 5B, PAU 5D and PAU 7.