Interpretation of fisheries indicators by Japan in 2003

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Abstract : Various fisheries indicators were examined to determine whether there is a need to conduct a full stock assessment in 2003. Most indices indicated stock as stable or in a recovery trend, though the Recruitment Monitoring acoustic index and lack of age 4 fish from 2003 Japanese longline catch suggested a possibility of substantial decline of recruitment level since 1999. With the understandings that the indices through the Recruitment Monitoring Program were difficult to interpret in terms of global stock fluctuation, we took this as a warning sign for the future. Japan supported the summary overview by External Scientists and their conclusion that there were no urgent need to re-analyze stock in 2003.

要約：2003 年の資源評価実施の必要性を検討するために、各種漁業資源指数を検討した。大部分の指標が資源が安定または回復傾向にあることを示したが、加入量モニタリング音響指数と 2003 年日本はえ縄漁獲に 4 歳魚が見られない点から、1999 年以降加入水準が大きく減少した可能性が示唆される。加入量モニタリング計画の指標は資源全体の変動という点から解釈するには困難があるとの理解の上で、今回の状況を将来への向けての警報と考えた。日本は外部科学者の概観、及び 2003 年に資源再評価を行う緊急の必要性はないという結論を支持した。

The 2002 Scientific Committee agreed to decide the need for full stock assessment in 2003 based on the situations of various fishery indicators. As in 2001, it was agreed that a full stock assessment would be conducted only if some unexpected changes of stock status were detected. Agreed set of updated indicators was exchanged and a summary overview by External Scientists was presented through e-mail. All the Members accepted the summary overview by the External Scientists expressing a detection of no unexpected changes and it was agreed to skip the 2003 full assessment as previously agreed through e-mail. This document is a record of our interpretation of various fisheries indicators that form the basis of our final judgment to accept the summarization by the External Scientists. Some of indicators were revised after the e-mail discussion held. Several indicators that were not exchanged but considered useful were also included here. The order of indicators are roughly corresponding to ages to be represented.

1. Recruitments:

- Acoustic survey:

Acoustic survey of the Recruitment Monitoring Program is aimed to monitor changes in

relative abundances of age 1 fish migrating through the survey area in the southwestern coast of Australia. Fig. 1 shows the updated results of survey, which was slightly different from the one exchanged due to adjustments made following the re-examination of original data set (Itoh and Nishida, 2003). This index represents the age 1 fish within the survey area standardized with 15 days' survey period. The index shows a drastic decline since 2000 and stays at very low level in 2002 with a slight upturn from 2001 level, then becomes non-estimatable level because of lack of records identified as SBT with a certain estimated biomass with sonar. It was reported that unusual rough weather resulted in a substantial reduction of effective survey hours in 2003 (Ueda et al, 2003).

The Shunyo-maru who conducted the survey in the same area right after the acoustic monitoring caught SBT juveniles throughout the acoustic survey area including a big catch with more than 100 fish within one day. The CCSBT tagging activities occurred in the same area after the acoustic survey were reported to complete with a great success, though fish were found inshore and further east of the survey area. Also, the evaluation work conducted in 2003 with No.2 Taikei and Shunyo-maru suggested that the detection power of sonar toward tuna and tuna-like species could be much lower than considered at the time of survey design (Sawada et al., 2003). There is a possibility that only a variation of fish abundance above a certain level of threshold could be monitored with the current survey design. Judging from these, the zero estimate of age 1 fish by the RMP acoustic survey should not be taken in a literary way. We decide to suspend the field survey for one year to concentrate the re-analysis of historical data and to determine potential and limit of this specific indices for recruitment monitoring.

As reported in the previous year, the cohort showing a drastic decline in 2000 is now main targeted age (age 3) for surface fishery in the Great Australian Bight (GAB) in 2002. Data from surface fishery did not indicate a significant decline of recruitment of this cohort as suggested by acoustic index. The surface fishery data for 2002/2003 was not available yet. Then, we missed the opportunity to compare further the acoustic indices with commercial catch data.

- Aerial survey:

The aerial survey has shifted its main survey efforts from the 2001/2002 season to collection of more detailed information from commercial aerial spotters working for tuna fisheries. Farley and Bestley (2003) reported the results to the Recruitment Monitoring Workshop. Although a limited level of line transect survey was planned to secure comparability between line transect survey results for 1993- 1999 and data collected from commercial spotters, rough weather in 2002/2003 prevented from conducting an adequate line transect activity. The commercial aerial spotters data showed decline of abundance. However, these results were not standardized. Because of

the nature of commercial activities, these data should be interpreted carefully and need appropriate standardization. Still, these data are considered as one of most reasonable abundance indices obtained from surface fisheries and the same data collecting system form commercial spotters should be maintained in a long term. At the same time, it is also important to continue an effort of parallel experiments, at least further several years.

- **Lack of age 4 fish from Japanese longline catch**

Fig. 2 shows a comparison of size composition of monthly catch obtained through RTMP. Comparing to the other years, the catch in 2003 shows a substantial reduction of small size fish. Fish under 115cm almost completely disappear from the catch. This feature is common for all months and fishing areas so far, though it is more obvious in Tasmania area. Fish smaller 120cm correspond to age 4. This is the same cohort that the acoustic monitoring survey detected a drastic decline of recruitment level in 2000.

If the recruitment trend detected by acoustic survey reflects the real situation, we expect four years' low recruitments to come in sequence. This can cause devastative impacts on SBT stock. The lack of age 4 fish from Japanese longline catch is a great concern, especially since the same sign was detected with the other independent survey. Although it is still premature to draw any conclusion, some preparatory consideration is need for the time when one more low recruits in sequence would become obvious from longline catches.

2. Longline catch data :

Fig. 3 is nominal CPUE of Japanese longline operations including those by joint-venture vessels by three agreed age-groups in an comparison with CPUE based on RTMP data. The most recent year's data almost exclusively rely on the data collected through the RTMP that covers only SBT targeting vessels. When all the other vessels' data become available in the following year, the CPUE of the most recent year tends to drop slightly. However, those differences have decreased gradually according to years, and almost no difference is found in 2001. The RTMP covers more than 95% of efforts in SBT distributing areas in recent years.

Nominal CPUE has increased in 2002 for younger age groups and stayed about the same as 2001 for age 12 and older. Recovery started in young ages in the early 1990's has passed through older age groups gradually. Now, plus group starts showing a clear sign of recovery.

Nominal CPUE of all other longline fleets suggest a gradual recovery or stable status for the last five years.

Fig. 4 shows nominal CPUE of Japanese longline by cohort by age. Overall levels of CPUE by cohort at least up to age 8 have gradually and substantially shifted toward upward since 1980-1985 cohorts. The 1986-1990 cohorts showed more drastic decline than the other cohorts, probably due to targeting towards small fish in the early 1990s caused by depleted stock status of cohorts recruited pre1986 and less structured management schemes at that time. Those cohorts recruited 1990 and after show much slower decline rate, suggesting a reduced level of exploitation rates for these cohorts. Peak CPUE also shifts to age 5 for the cohorts 1990 and after. Those seem to indicate steady recovery of stock size and better management for the cohorts recruited after 1990, the year when a substantial reduction of TAC was occurred.

3. Indonesian Catch (Spawning ground fishery) :

Indonesian catch estimates were provided by Australia. Fig. 5 shows changes of Indonesian SBT catch both in number and weight as well as catches by two age groups, age 8-16 and age 17 and older. Those are estimated by combining age frequency of catch provided from CSIRO with estimation catch in number obtained by dividing catch weight by average body weight derived from size composition of catch.

A substantial increase of catch in 2001/2002 season was mainly derived by large increase of younger age classes. Gradual and steady recovery of young age group within Indonesian catch since 1994/1995 season is obvious from changes in age composition shown in Fig. 6. These fish correspond to those cohorts who did not experience a heavy exploitation by surface fisheries in the late 1980s and early 1990s. This suggests that the management actions taken in the late 1980s finally starts showing its effects to the recovery of spawning stock. At the same time, the older portion of spawning stock continues to decline, which give some concerns. With both positive and negative signs for spawning stock, it is difficult to give an overall assessment of the situation.

4. Overall Conclusion :

Generally, indicators examined support a view of stable recovery trend. However, two signs a noted as points of concern; lack of age 4 fish from longline catch in 2003 and gradual depletion of old fish from spawning area. Though we agree with the External Scientists' view that there is no sign to suggest an urgent need to re-analyze the stock status in 2003, there is a need to keep a close watch on those warning signs.

References

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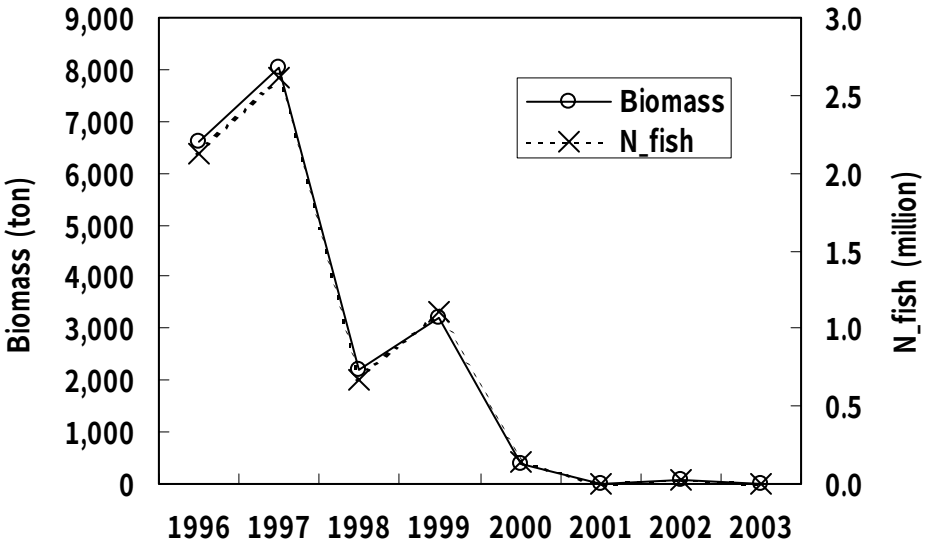

Fig. 1. Trends of acoustic index of age 1 SBT in the Western Australia (revised).

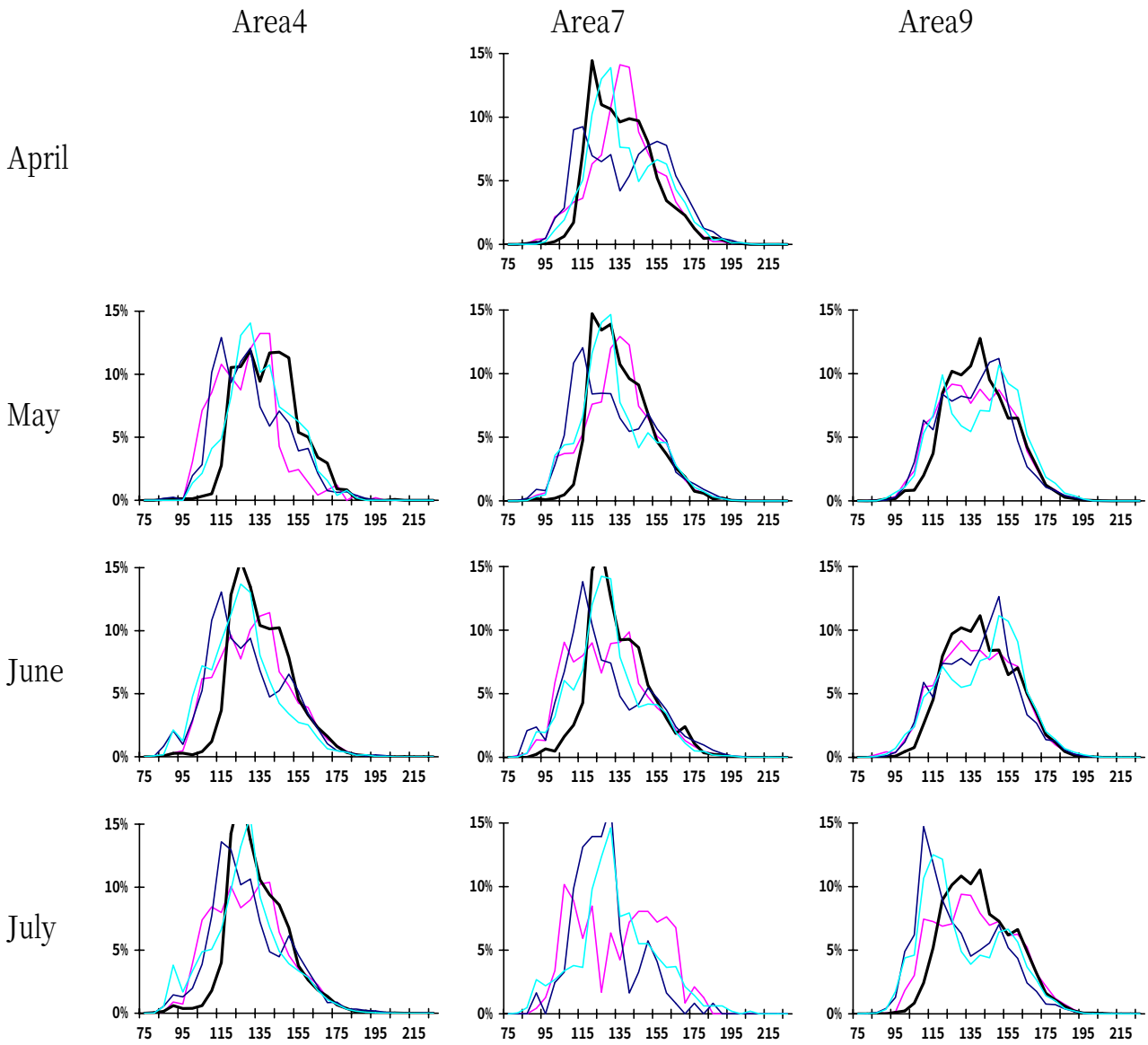

Fig. 2. Comparison of size composition of RTMP catches from 2000 to 2003. Bold lines show composition for 2003.

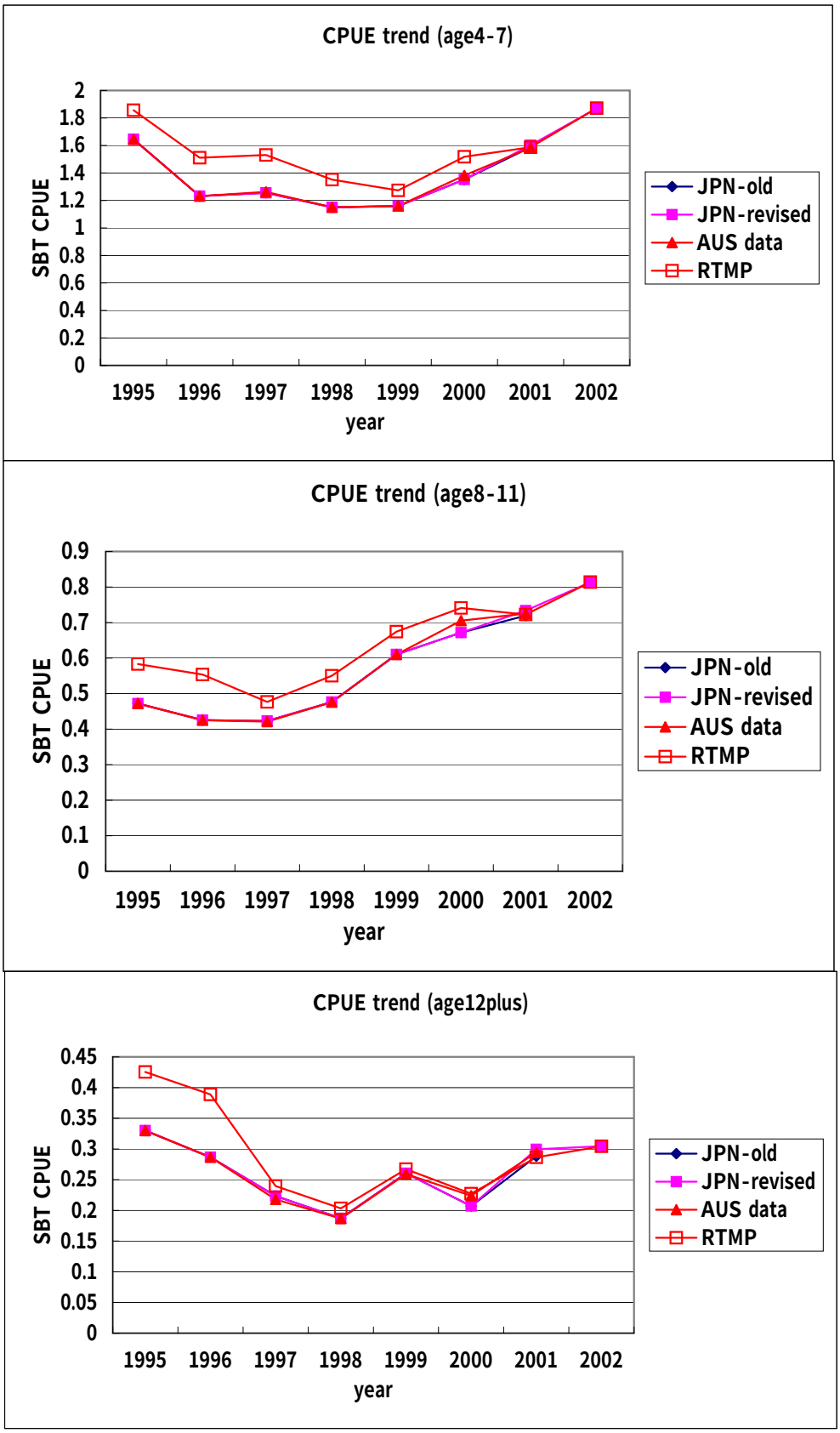

Fig. 3 Nominal CPUE of Japanese longline. Comparison with RTMP CPUE included.

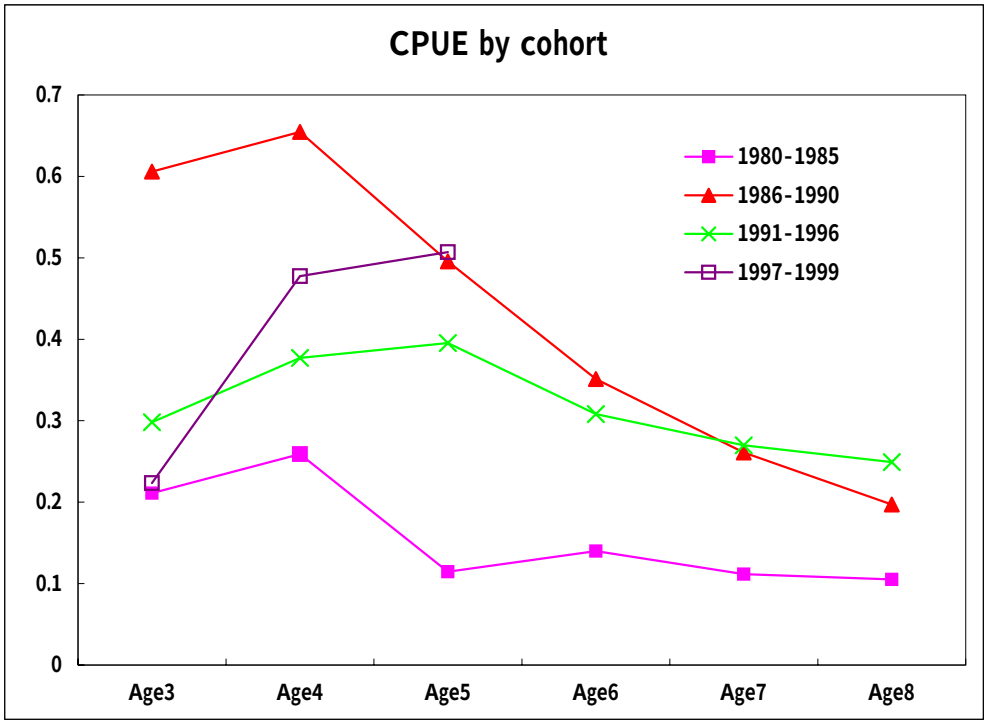

Fig. 4 Japanese longline CPUE by group of cohorts and by ages.

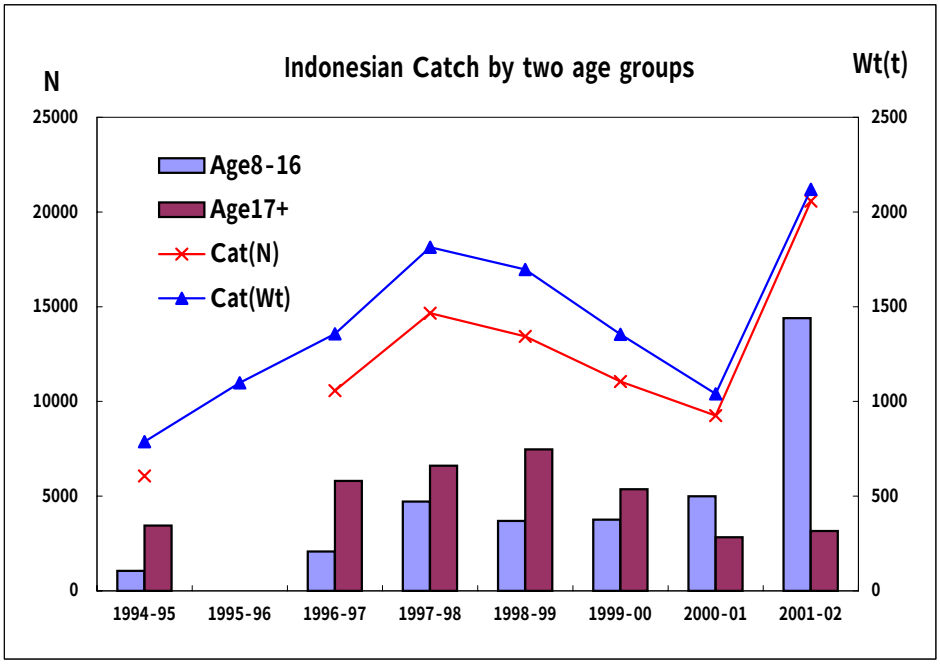

Fig.5 Catch trends of Indonesian catch, especially those of two age groups, age 8-16 and age 17 and older.

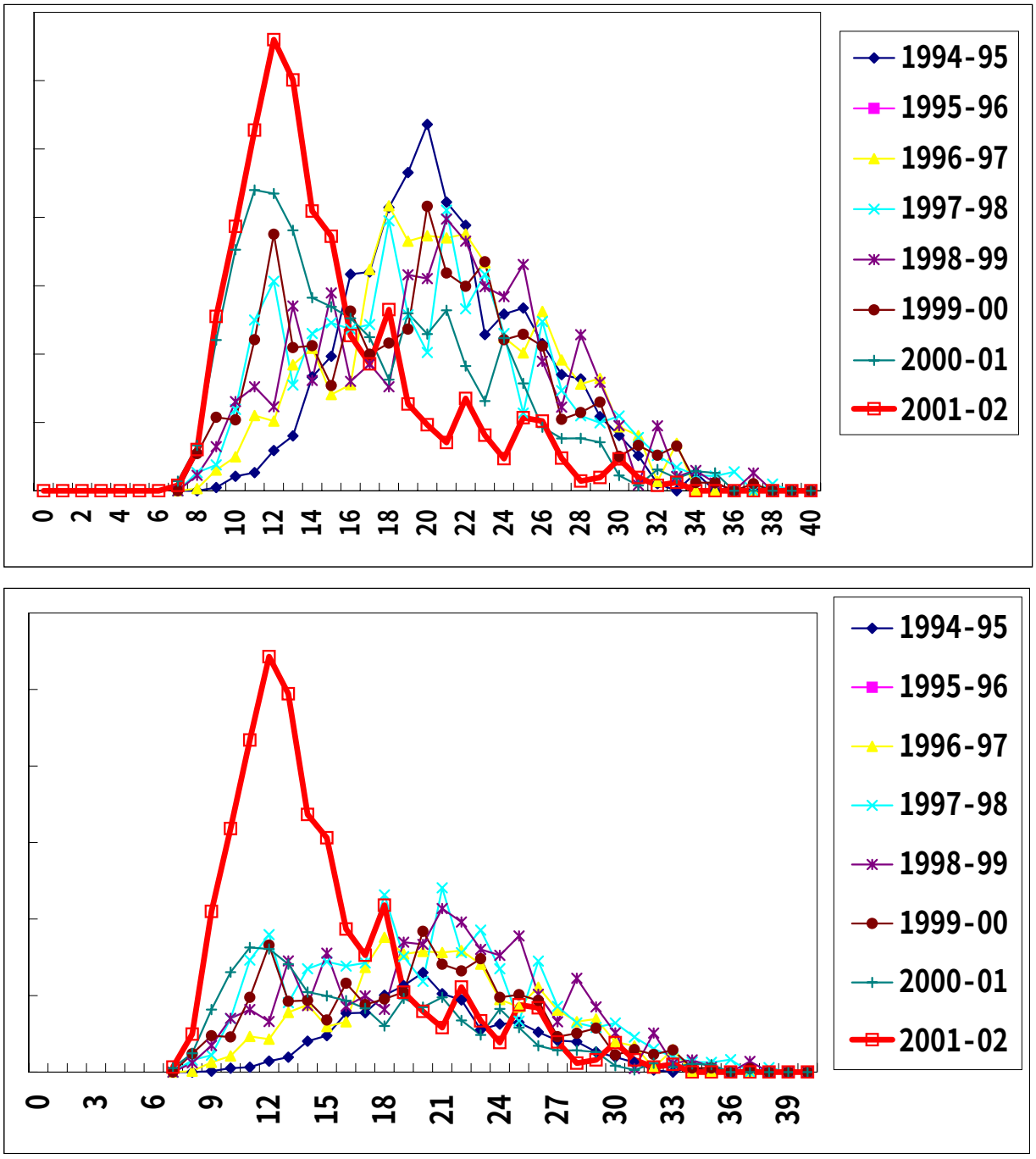

Fig.6 Age composition of Indonesian catch in relative (lower) and absolute (upper).