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| project XXWorkshop on yellowfin and bigeye tuna age and growth |
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| **Project** | **Workshop on yellowfin and bigeye tuna age and growth** |
| Objectives | To further improve age estimates for bigeye and yellowfin tuna in the WCPO to inform future stock assessments and related analyses through an inter-lab ageing workshop designed to specifically consider annual and daily ageing approaches between WCPFC and IATTC |
| Rationale | This project builds upon work to date under Project 35 and reported in Farley et al. (2017; SC13-SA-WP-01), work under Project 81 and reported in Farley et al. (2018a SC14-SA-WP-01), and work under Project 82 reported in Farley et al. (2018b; SC14-SA-WP-13).During review of Farley et al. (2018a) and Farley et al. (2018b) during SC14, and based on recommendations from the SPC Pre-Assessment Wokshop (PAW) in April 2018, it was noted that the differences in ageing approaches between WCPFC and IATTC needed further investigation.Inter-laboratory ageing workshops have proven to be a useful approach in such situations for tunas including albacore, southern bluefin, Pacific bluefin, Atlantic bluefin (see Anon 2002; Anon 2004; Rodriguez-Marin et al. 2007). The 2018 SPC PAW (Pilling and Brouwer 2018) recommended:* A workshop should be arranged to compare techniques and age estimates between otolith reading labs, to standardise the approaches for daily increment counts. If possible IATTC and FAS should read sister otoliths for daily counts, based upon SrCl marked otoliths.

The 2018 bigeye reassessment paper (Vincent et al. 2018) recommended:* Analyzing the same otoliths by different laboratories, to build condence in ageing estimates and to estimate ageing error.
* Collect otoliths of very small bigeye that are captured by the Indonesian, Vietnamese, and Philippines domestic fisheries in region 7 and estimate age through daily ring counts to aid the estimation of the L1 parameter within the assessment model.”

The project will begin with the analyses of strontium chloride (SrCl2) marked otoliths from WCPO bigeye and yellowfin by CSIRO, Fish Ageing Services (FAS) and IATTC. In addition, YFT otoliths from the EPO will be prepared and read by FAS using annunal ageing methods (sister otoliths to those read by IATTC using daily ageing methods). BET and YFT otoliths from the WCPO will also be also prepared and read by IATTC using daily ageing methods (sister otoliths to those read by FAS using annual ageing methods). An inter-laboratory workshop will then be held to discuss ageing methods among specialists to resolve dfferences in ageing methods. A report will be presented in 2019 at SC15. |
| Assumptions | * The strontium chloride marks on bigeye and yellowfin otoliths currently held in storage at CSIRO are still visible for validation purposes.
* Otoliths can be collected from bigeye stock asssessment region 7 in August/September 2018, and there is sufficient time available to age these otoliths in advance of the inter-lab workshop.
* Otoliths are exchanged (CSIRO and IATTC) prior to the inter-lab ageing workshop.
* IATTC and CSIRO complete the pre-workshop readings in advance of the workshop.
* All necessary data are made availbe by both labs prior to the workshop.
* Otoliths from the WCPFC Tuna Tissue Bank will be released without needing to have the research proposal approved by the SC Research Committee.
* CSIRO will undertake the core work (and Fish Ageing Services (FAS) P/L, Australia) will undertake the primary aging work) and will actively collaborate with the Scientific Services Provider and IATTC in the conduct of the analyses.
* SPC will provide its time through other projects.
* CSIRO will provide in-kind funding of US$20,000 for the project.
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| Scope | Prior to the workshop, the project will:* Analyse three SrCl2 marked bigeye otoliths and three SrCl2 marked yellowfin otolthis from the WCPO using the daily ageing method by IATTC and annual ageing methods by FAS using sister otoliths from the same fish.
* Analyse an additional three bigeye and three yellowfin tuna otolthis from the WCPO using the daily ageing method by IATTC and FAS to resolve differences in ageing methods (using sister otoliths from the same fish).Analyse 50 bigeye otoliths from small fish region 7 using the daily increment method by FAS;

During the workshop, the participants will:* Jointly read/examine WCPO and EPO otolthis prepared for the project;
* Jointly read/examine EPO otolthis previously prepared by IATTC (i.e., otolthis used in the IATTC age validation work, and additional otolthis from the full size range available);
* Jointly read/examine WCPO otolthis previously prepared by FAS for annual ageing.
* Discuss and share ageing methods to improve skill and resolve dfferences in ageing methods.

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| Timeframe | 12 months |
| Budget | US$15,000\*\*Note that this covers the CSIRO component of the work (including use of FAS pre-workshop), SPC work in advance of the workshop, and CSIRO, FAS and SPC travel to the workshop. This budget includes SEM reading of strontium chloride marked otoliths, reading bigeye otoliths using the daily method for smaller fish in stock assessment area seven, prepation and reading of yellowfin and bigeye WCPFC otoliths for the workshop, and preparing a report for WCPFC15. |
| References | Anonymous (2002) A manual for age determination of southern bluefin tuna *Thunnus maccoyii* – otolith sampling, preparation and interpretation. The direct age estimation workshop of the CCSBT, 11–14 June, 2002, Queenscliff, Australia. Anonymous (2014) Pacific bluefin tuna and albacore tuna ageing workshop. International Scientific Committee for tuna and tuna-like species in the North Pacific Ocean, 13–16 November, Shimizu, JapanFarley, J., Eveson, P., Krusic-Golub, Sanchez, C., Roupsard, F., McKechnie, S., Nicol, S., Leroy, B., Smith, N., and Chang, S-K. 2017. Project 35: Age, growth and maturity of bigeye tuna in the Western and Central Pacific Ocean. SC13-SA-WP-01. Thirteenth regular session of the Scientific Committee of the Western and Central Pacific Fisheries Commission. Rarotonga, Cook Islands, 9-17 August 2017.Farley J, Eveson P, Krusic-Golub K, Clear N, Sanchez C, Roupsard F, Satoh K, Smith N, Hampton J. 2018. Update on age and growth of bigeye tuna in the WCPO WCPFC Project 81. WCPFC-SC14-2018/ SA-WP-01. Fourteenth regular session of the Scientific Committee of the Western and Central Pacific Fisheries Commission. Busan, Republic of Korea, 8-16 August 2018.Farley J, Krusic-Golub K, Clear N, Eveson P, Smith N. 2018. Progress on yellowfin tuna age and growth in the WCPO WCPFC Project 82. WCPFC-SC14-2018/ SA-WP-13. Fourteenth regular session of the Scientific Committee of the Western and Central Pacific Fisheries Commission, Busan, Republic of Korea, 8-16 August 2018.Vincent MT, Pilling GM, Hampton J 2018. Incorporation of updated growth information within the 2017 WCPO bigeye stock assessment grid, and examination of the sensitivity of estimates to alternative model spatial structures. WCPFC-SC14-2018/ SA-WP-03. Fourteenth regular session of the Scientific Committee of the Western and Central Pacific Fisheries Commission. Busan, Republic of Korea, 8-16 August 2018.Pilling G, Brouwer S, 2018. Report from the SPC pre-assessment workshop, Noumea, April 2018. WCPFC-SC14-2018/ SA IP-01. Fourteenth regular session of the Scientific Committee of the Western and Central Pacific Fisheries Commission. Busan, Republic of Korea, 8-16 August 2018.Rodriguez-Marin E, Clear N, Cort JL, Megafonou P, Neilson JD, Neves dos Santos M, Olafsdottir D, Rodrı´guez-Cabello C, Ruiz M, Valeiras J (2007) Report of the 2006 ICCAT Workshop for bluefin tuna direct ageing. Coll Vol Sci Pap ICCAT 60(4):1349–1392. |