Conception Of An Electronic Identification Key For Juvenile And Adult Stages Of Some Bony Fishes Families From Southwestern Madagascar

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Background

Identification of marine fish species during fishery surveys remains difficult to achieve in real time. Identification guides are sometime outdated and often inefficient, especially for the young stages. As they are mainly available in printed form, they are costly to update and thus lack the new data and advances in fish taxonomy. Hence, the interest in electronic identification keys to mitigate these problems. An electronic key is an interactive identification tool that consists of a succession of alternatives and choices based on the characteristics of each species. It can be easily updated and made accessible online, or on any numeric platform. Previous studies in WIO have focused on the conception of an electronic key for fish post-larvae. As the catches of small-scale fisheries consist in juvenile and adult stages, the conception of an electronic identification key for these stages is required. This study aimed to propose the best approaches for the conception of one key per family based on the pictures of each species.

Method

For this test, four families among the 191 families present in Madagascar were selected, namely Acanthuridae, Chaetodontidae, Lethrinidae and Mullidae. These families were chosen because of their specific richness and the phenotypic variability between individuals of the same species. A key per family was developed using the Lucid3.3 builder following seven successive and interdependent steps forming the proposed approach. This approach was based on the coding of descriptors and states (related to color and task patterns, morphology and meristic information), the optimization of their number and finally the evaluation of each key. The latter was done by six testers competent in various domains.

Results

The proposed approach proved to be efficient despite a long search time (3 hours minimum for 20 individuals). This efficiency could be demonstrated by the promising identification success rate per family, ranging from 53% for Mullidae to 73% for Acanthuridae. When developmental stages are considered separately, the highest success rate was observed for Lethrinidae adult stage with 78% of individuals identified. In contrast, no juveniles of this family were successfully identified to the species level.

Conclusion
The keys that were developed appears efficient for families with low species similarity except for the Lethrinidae. To improve the identification of fish juveniles for this family, the development of a key for each developmental stage is recommended. The presented approach can be used as a basis while adding more correction and improvement steps would undoubtedly allow achieving more satisfactory results.