

GEOMETRIC MORPHOMETRICS: A METHOD FOR RAINBOW TROUT STOCKS IDENTIFICATION IN AQUACULTURE

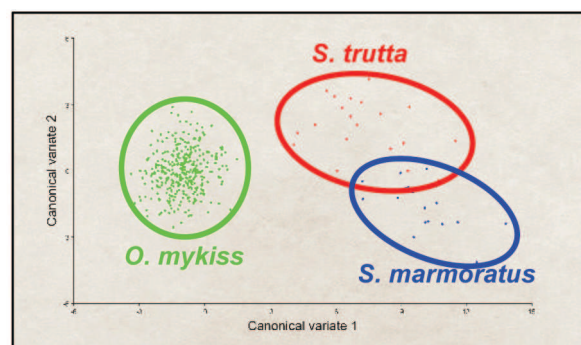
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Stock identification is an interdisciplinary field that involves the recognition of self-sustaining components within populations and is a central theme in fisheries science and management. Despite its importance, stock identification remains one of the most confusing subjects in fisheries science for non-specialists, with a wide variety of approaches and conflicting terminologies and interpretations. Characters used to identify fish stocks can be divided into three groups: those that are purely genetic, those that are purely environmental, and those that may reflect both genetic and environmental variation. Body shape is a difficult, but important, trait to quantify. Patterns of morphometric variation in Rainbow trout, and generally in fishes, indicate differences in growth and maturation rates because body form is a product of ontogeny. Morphometric analysis provides a powerful complement to genetic and environmental stock identification approaches. We collected totally 2193 digitized images from the left side of 14 different stock of Rainbow trout (*O. mykiss*) reared in 13 Trentino fisheries.

Using TPS software 24 homologous landmarks were placed on each fish shape, *rigor mortis* arching effect was corrected, and then landmark coordinates were adjusted using a generalized procrustes analysis (GPA). The collected data were analysed by NTsys statistical software and MorphoJ program. To test the good of fitness of ours homologous landmarks, we performed an exploratory morphometric

analysis on an heterogeneous unit composed of three salmonids species (*O. mykiss*, *S. trutta* and *S. marmoratus*). There are broad shape differences between the two genus *Oncorhynchus* and *Salmo*, and a partial overlap between marble and brown trout, due to the presence of some hybrids (Graph 1). Moreover these method yielded evidence of morphological differences among different stock of rainbow trout, and within the same stock reared into different environmental condition. Surprisingly it's possible to split triploid from diploid individuals from a mixed population too. In the context of interdisciplinary stock identification, morphometric analysis provides information on phenotypic stocks or groups of individuals and moreover on environmentally induced phenotypic patterns.



Graph 1: CVA performed on 3 salmonids species.