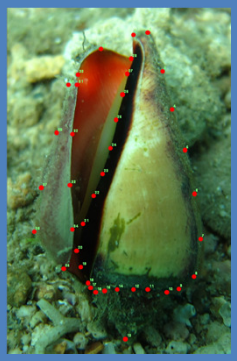
Geometric Morphometrics as Field Survey Instrument

Katherine P. Sanchez-Escalona
Philippines
nyctarinia@yahoo.com

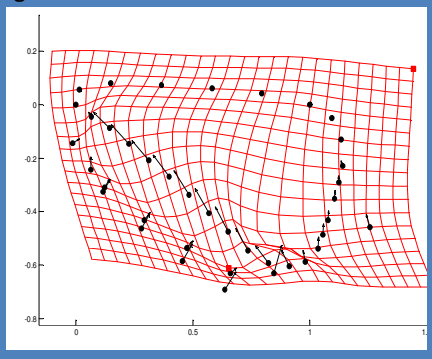
Taxonomy is a basic tool for studying biodiversity. It allows differentiation of observed biota, and as a consequence, comes up with indexes that may be compared across ecosystems that may serve as basis for conservation prioritization as well as management options. The tool, however, depends greatly on honed skills of researchers that resulted from close examination of collected samples. For modular organisms, this may not be a problem, but is always a limitation for non-modular organisms.

Geometric morphometric (GM) is a method that uses mathematical differences in shape that may be statistically compared using multivariate analysis (Slice, 2007; Zeldich et al., 2004). Shape is mathematically projected as a series of coordinates and the resulting data maybe used either to classify organisms cladistically (Adam, Rohlf and Slice, 2013), taxonomically (Cruz et al., 2012), or to infer other biological and ecological differences (Tsuboi et al., 2014). As pictures are used in the analysis, it is non-destructive and artifacts of collection can be eliminated from the analysis.

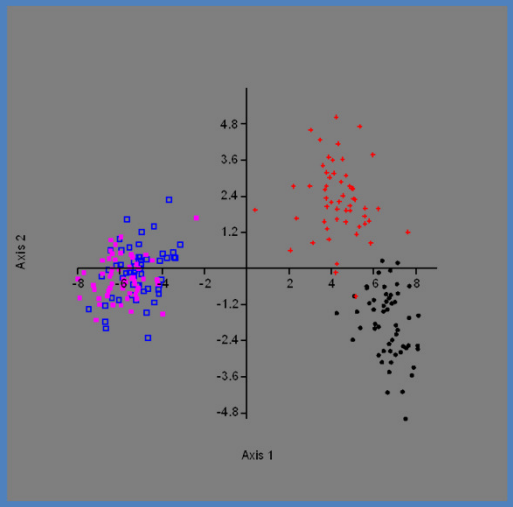
To illustrate the utility of GM in field surveys, it was used to identify age classes of a heavily harvested gastropod *Strombus luhuanus*.



Organisms were photographed on its adaxial side where landmarks were superimposed on the figures.



The landmarks were converted into a mesh figure (thin-plate spline) to visualize shape changes.



Canonical Variate Analysis scatter plot showed significant differences of mean shapes of each age class (black dot=0-1 year old; red cross= 1-2 years old; blue square= 2-3 years old; pink squares= 3-4 years old). Axis 1 accounts for 55.56% of the variance while Axis 2 accounts for 24.71% of the variance ($F=1.63$; $df1=210$; $p= 7.33^{-6}$).

Literature Cited

Adam DC, Rohlf FJ, and Slice DE. 2013. Hystrix. 24, 7-14

Cruz RA, Pante JR, Rohlf FJ. 2012. Zoological Journal of Linean Society 165:2, 296-310.

Slice, D. E. .2007. Annual review of anthropology, *36*, 261–281.

Tsuboi M, Gonzales-Voyer A, Kolm N. BMC Evol Bio 14:38, 1-10.

Zelditch , Miriam Leah, Donald L. Swiderski, H. David Sheets. 2004. *Geometric morphometrics for biologists: a primer.* 456pp.