Genetic-environment interaction (GxE) in fish

Quantitative traits are usually controlled by several genes as well as by environment influences. Environments could include stocking density, feeding, water quality management, …etc

Hence: the phenotype of an individual (P) = G + E + G-E

Whereas G= genetic make-up; E= environment & G-E= genetic-environment interaction

G-E exists when various genotypes perform differently in different environments

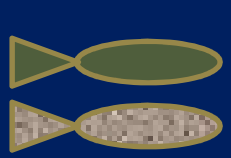
If compared genotypes maintained their rank in different environments → **no G x E**

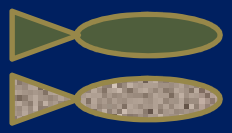
Abdel Rahman El Gamal

GXE (Example)

Genotype	Environment A	Environment B	
Strain A	80	60	No interaction
Strain B	60	40	
Strain A	80	60	Mild interaction
Strain B	60	60	
Strain A	80	50	Strong interaction
Strain B	60	70	

Genetic-Environment Interaction (GXE) in fish

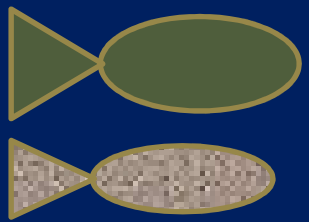


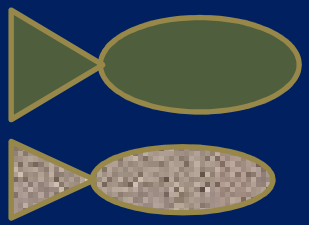


Illustrated example:

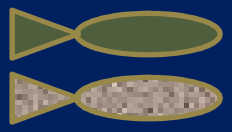
Environment A: earthen ponds whereas the nutrition relies more on organic manure & supplemented by artificial feed

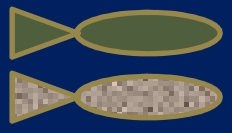
Environment B: earthen ponds with aeration and higher stocking density whereas complete artificial feed is the only source of nutrition



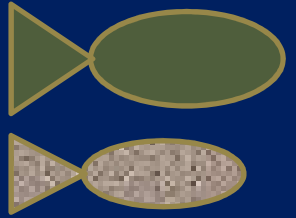


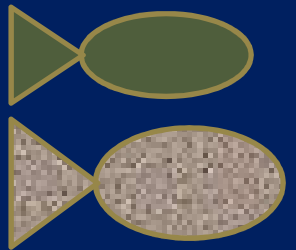
NO GXE





The data should be statistically analyzed and result of well-designed experiment starting with fish of the same size/age





YES GXE

Abdel Rahman El Gamal