



Sex determination of Delta Smelt: Different ways to distinguish captive adults

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Method 1: Morphometric

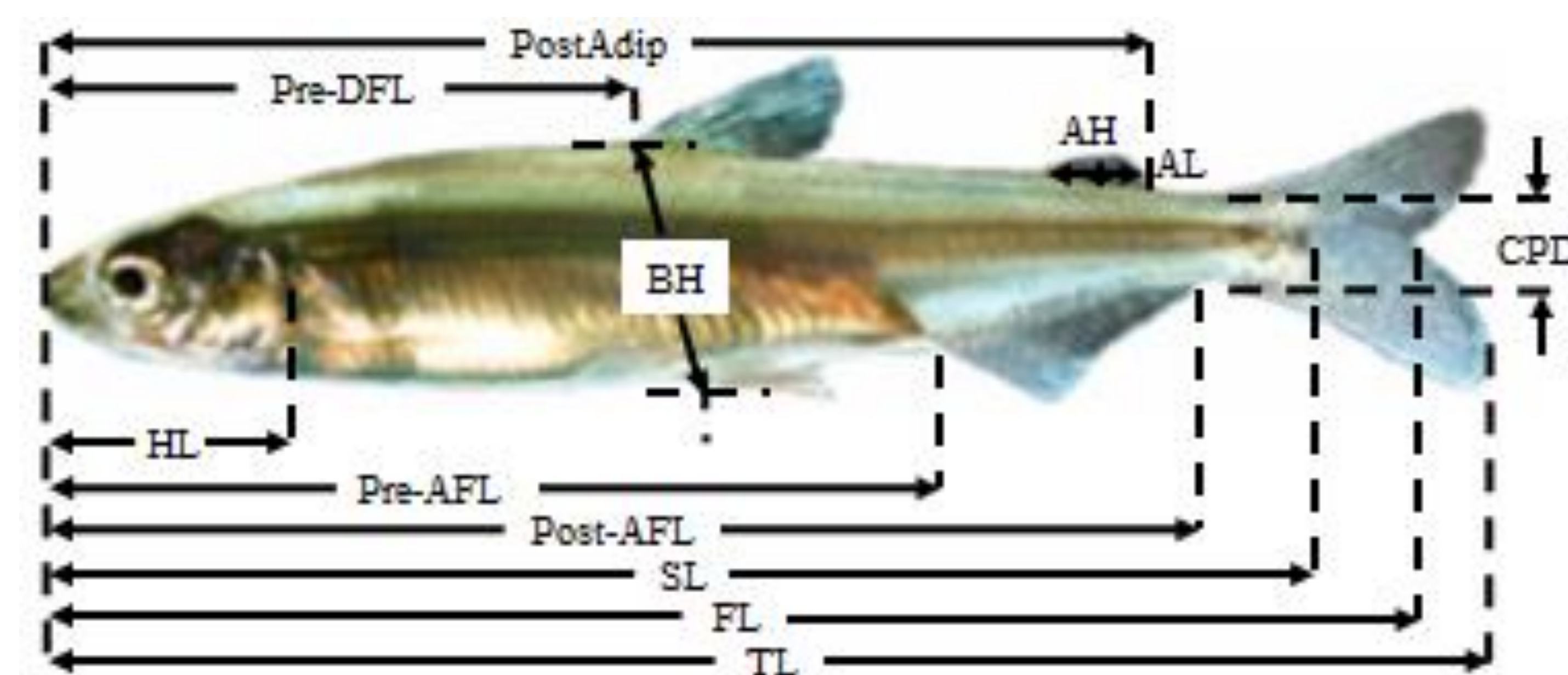


Fig 1. Morphometric variables for adult Delta Smelt.

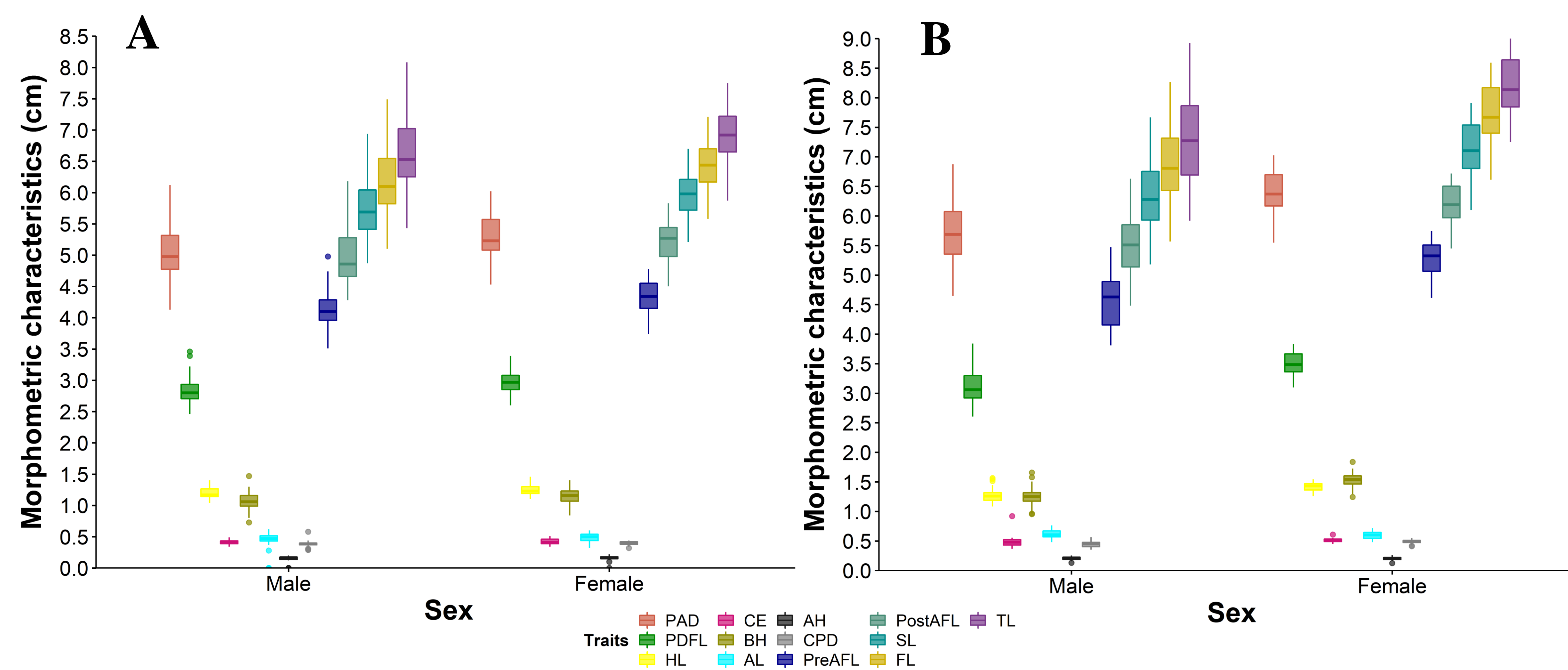


Fig 2 : In the early adult stage (A) and post-spawning stage (B), the multivariate analysis of variance shows that all measured traits in females are significantly larger than the males' traits except AL & AH.

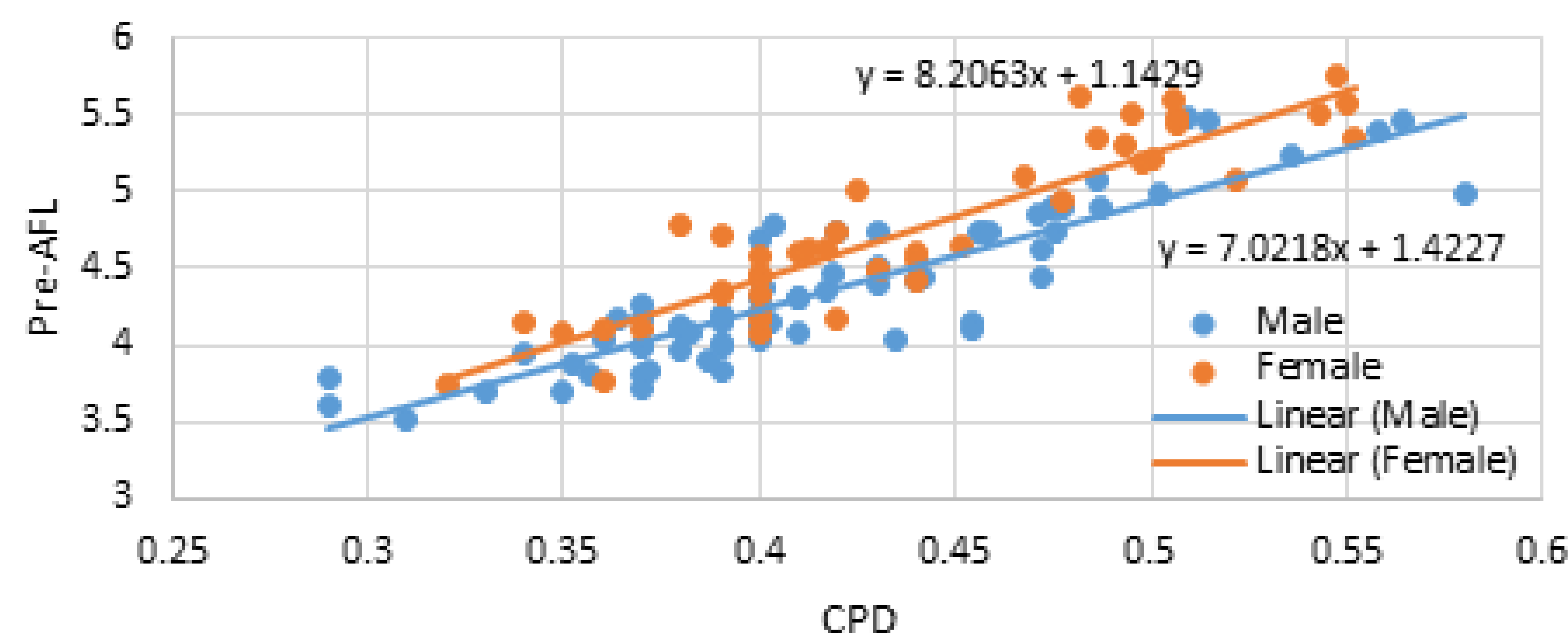


Fig 3. Relationships between pre-AFL and CPD and between genders in the early adult stage and post-spawning stage, the slope of the line in females is higher than males.

Method 2: Body Shape



Fig 4. Image of an adult Delta Smelt with landmarks indicated. Procrustes superimposition plot of Delta Smelt landmark configurations (Photo: 2013 and 2014 in the post-spawning stage, May 21-28, n = 62 male, 64 female).

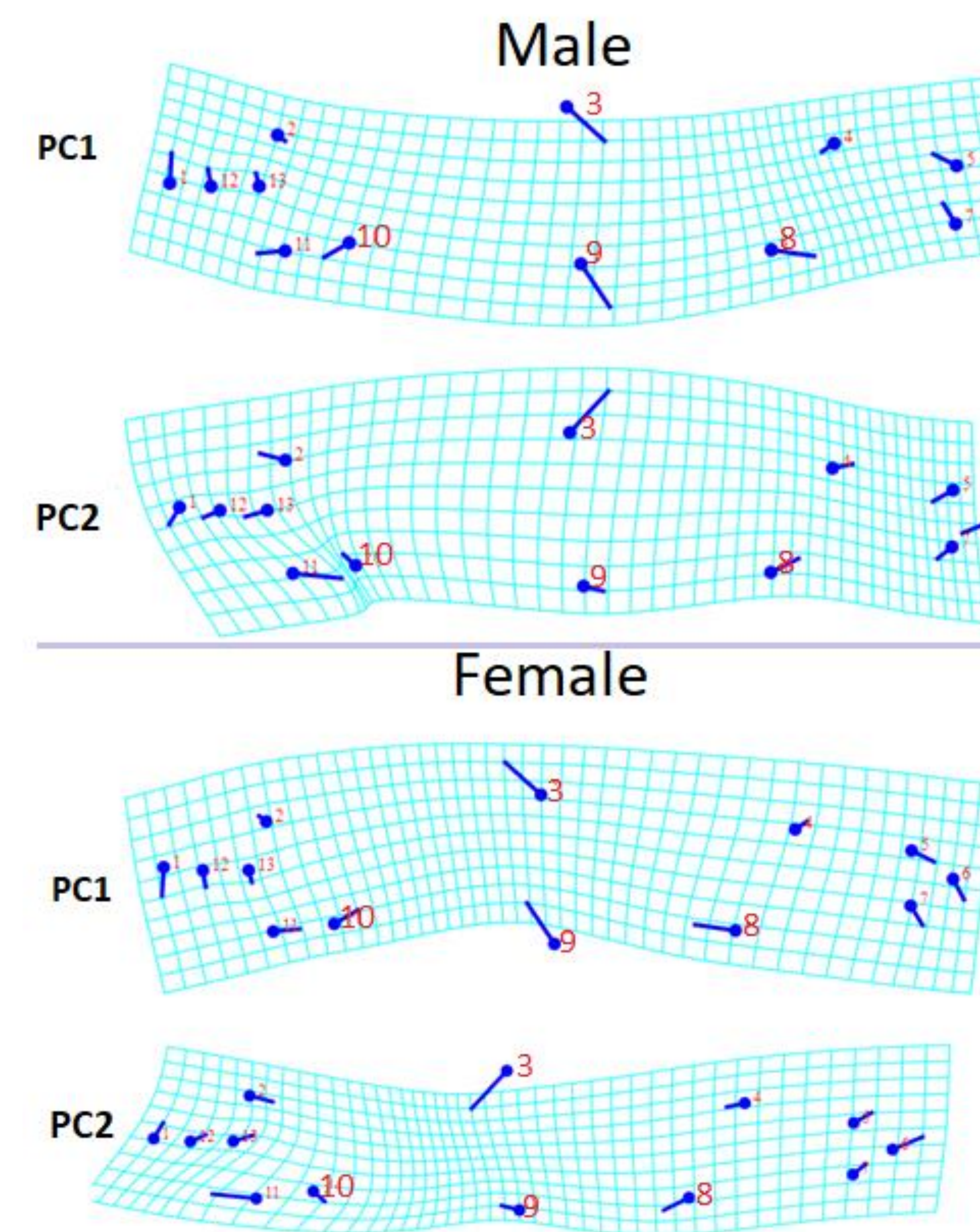
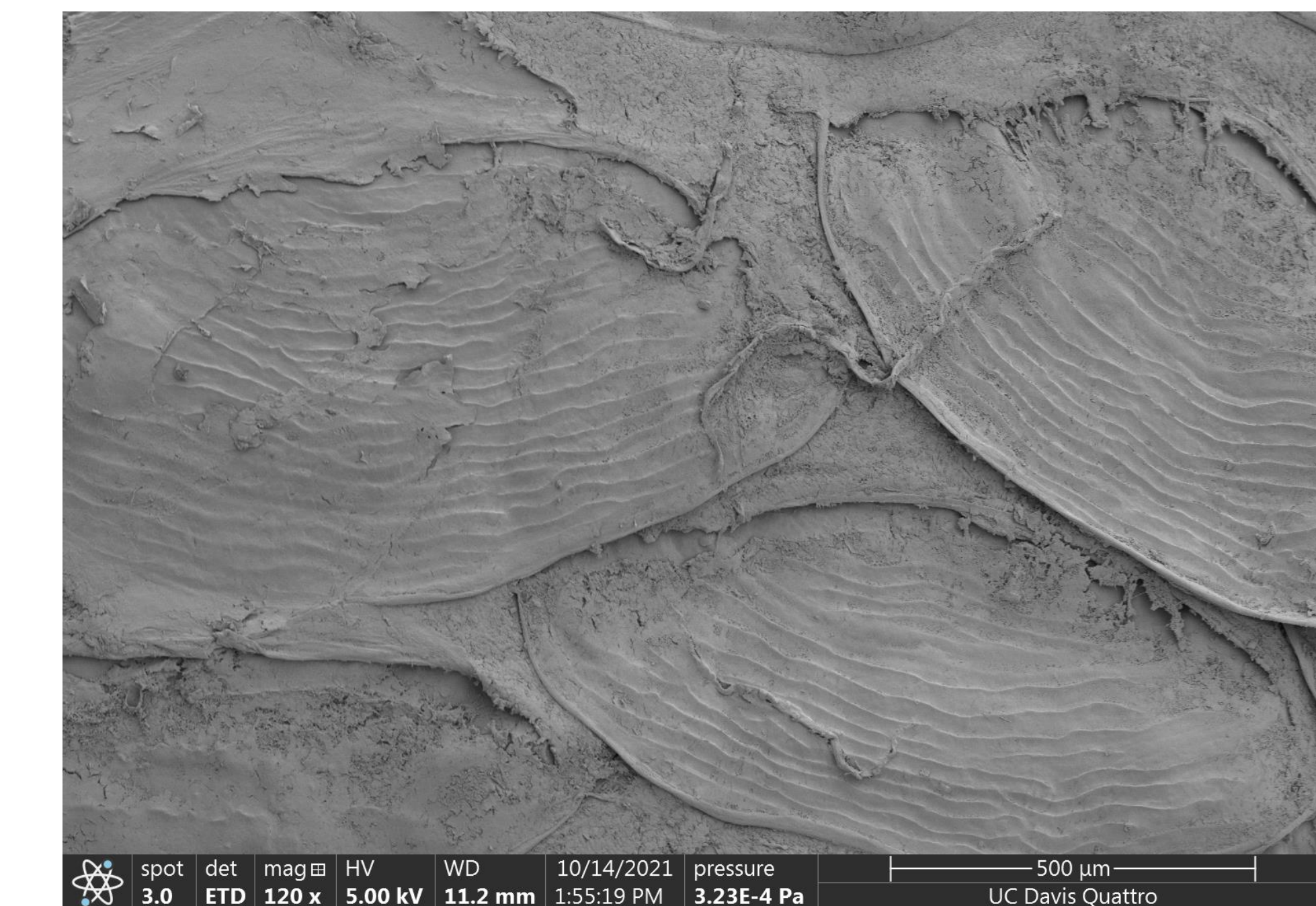


Fig 5. Shape variation is captured by the first two principal components. The plotted PC1-PC2 revealed the variation in the area of landmarks 3, 8, 9, and 10, i.e. elongation or shrinkage of the belly area. In the post-spawning stage, the male's belly area is bigger than the female's.

Method 3: Skin Structure

MALE



FEMALE



Fig 6. SEM images, male scales are rougher than female scales due to the presence of ridges and convex grooves.

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