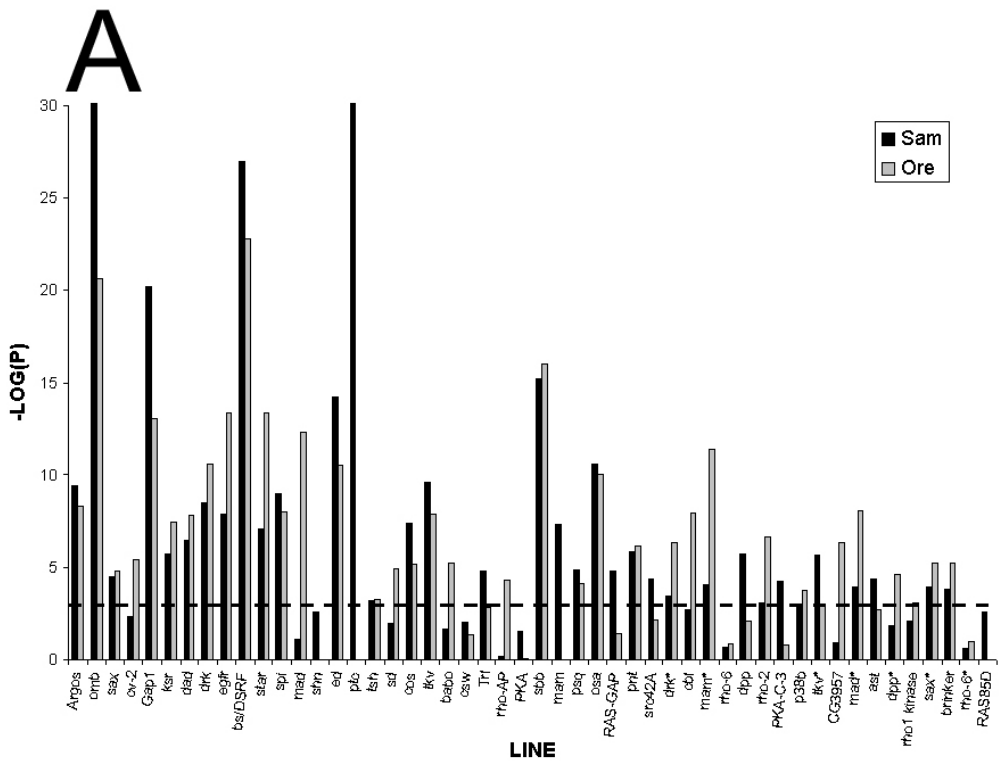
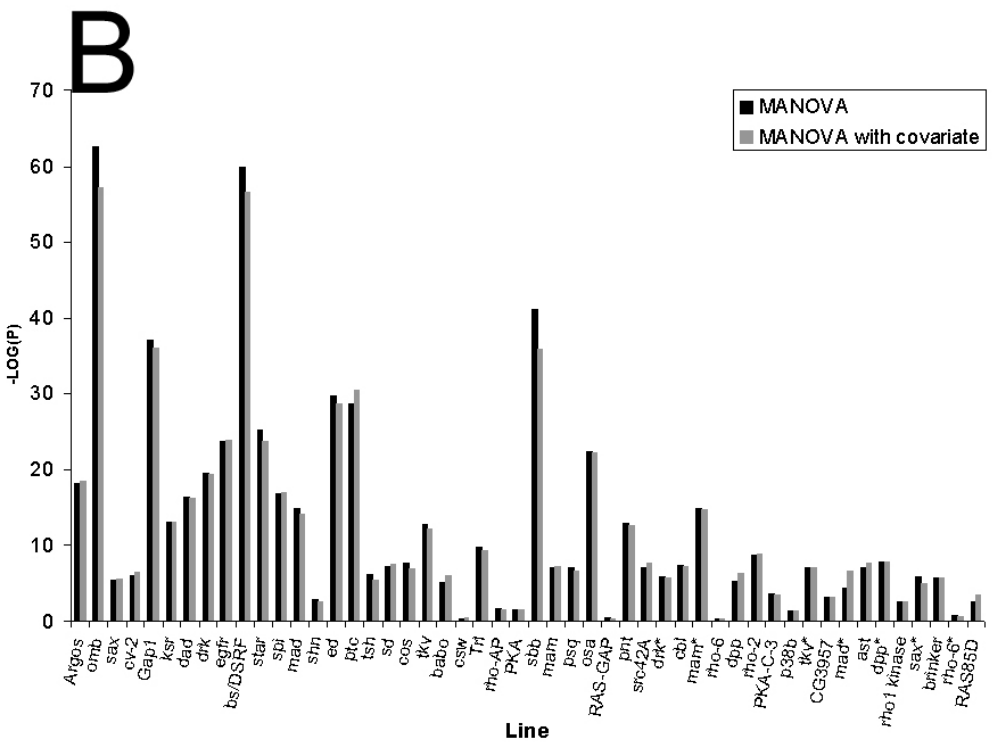
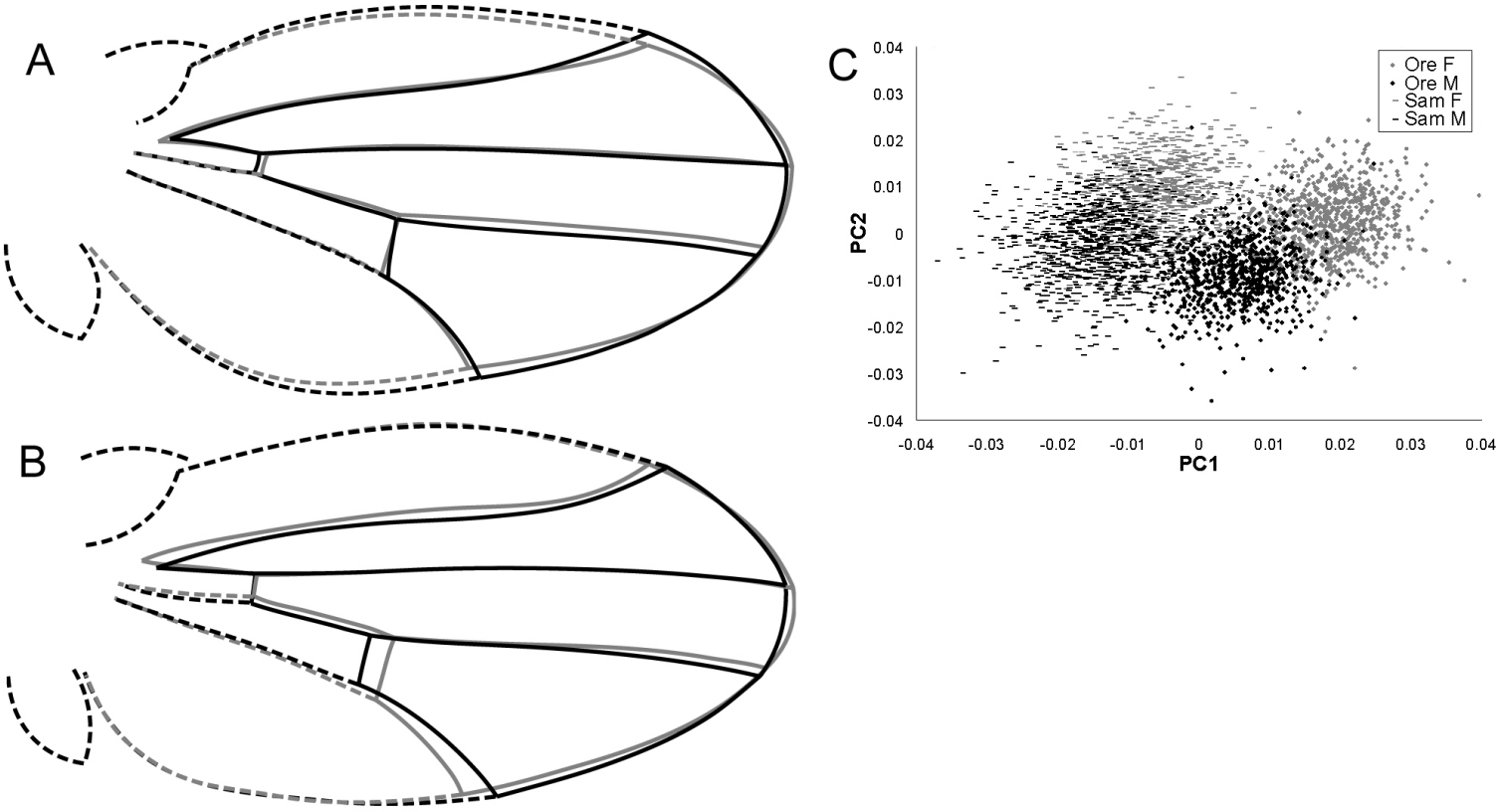




S1. The effects of mutations on wing shape. A) When the mutations are examined in each background separately a similar picture is observed as compared to the combined analysis as shown in Figure 2. In a number of instances, the mutations show a significant effect in one genetic background, but not the other, consistent with strong background effects. B) Including centroid size as a covariate does not alter the strength of the association between mutant genotype and wing shape. This suggests that the effects of the mutations on shape are invariant to allometry with size.



S2. The effect of sex and genetic background on wing shape. A) The effect of sex on wing shape. Males (black) differ subtly from females (grey) largely in a widening of the wing. The majority of the shape difference between the sexes is a consequence of allometry (see text). B) The two genetic backgrounds used for the introgression of mutations demonstrate profound differences in shape. The Sam strain (black) shows a strong proximal shift for the posterior cross vein relative to the Ore-R strain (grey). In addition, there is a relative distal displacement of Sam relative to Ore-R in the posterior region of the wing. The magnitude of the vectors were multiplied by 3X to facilitate visual inspection. Solid segments represent estimated connections between landmarks sampled in this study. The dashed lines are used to illustrate the remaining wing morphology. C) Separation of genetic background and sex effects by principal components analysis. The first and second principal components from the entire data set clearly represent the variation due to background and sex respectively. Within each background and sex combination, the mutant genotypes can be found, clearly demonstrating that they provide a much smaller amount of variation for the data set.