File S2

Supporting information

Introgression effects on size and shape

Introgression hybrids NENEH2(A), DEE1(B), and 2H3(B) all possess significant differences in posterior lobe area compared to D. sechellia w (F14,110=2.31, P=0.008; F14,131=3.96, p<0.001; F14,124=2.18, P=0.012, respectively), but posterior lobe area in each of these introgression hybrid genotypes was significantly larger than that of D. sechellia w. Also, although introgression 2H3(B) had a statistically significant effect on posterior lobe shape, the distribution of principal components appeared to move away from that of D. mauritiana (see Figure S1). The posterior lobe shape of introgression hybrid 2H3(B) appears to possess wider neck and baseline regions compared to D. sechellia w. To test this apparent difference in the posterior lobe width, we measured the length of the artificial baseline used to enclose our posterior lobe outlines in D. sechellia w and 2H3(B). Introgression hybrid 2H3(B) does indeed possess significantly longer baselines than D. sechellia w (\( \bar{X}_{\text{sech}}=0.076\pm0.001 \) mm, \( \bar{X}_{2H3(B)}=0.089\pm0.001 \) mm, P<0.0001). This 2H3(B) posterior lobe shape that lies outside of the range of the pure species shapes might result from either transgressive segregation or Dobzhansky-Muller incompatibilities between D. mauritiana and D. sechellia alleles as discussed in the text.

Sensitivity of morphometric techniques

Introgressions 4C2(A) and Q1(A) both possess significantly smaller posterior lobe areas, but have no significant affects on area-normalized posterior lobe shape. It seems possible that because these introgressions possess shapes not significantly different from that of D. sechellia w, this aspect of their morphology might lessen the statistical effect of their small but significant differences in posterior lobe area when size and shape are combined when calculating elliptical Fourier coefficients. (Similar results were also obtained for introgressions that possess significantly larger posterior lobe areas than D. sechellia w, but no significant difference in posterior lobe shape). To determine if our morphometric methods were in fact sensitive enough to detect differences in morphology when posterior lobe size and shape are combined, we dissected and measured 20 F1 hybrid males obtained from crosses between D. sechellia w females and D. mauritiana males. These males show substantial differences in both posterior lobe size and posterior lobe shape compared to D. mauritiana and D. sechellia w (Figure 1). Compared to D. sechellia w, F1 hybrid males have significantly reduced posterior lobe area (\( \bar{X}=3.110\pm0.0929 \times10^{-3} \) mm², \( P=3.75\times10^{-11} \)) and also show significant differences in posterior lobe shape when we normalize area (\( F_{14,61}=4.40, P=2.40\times10^{-5} \)). When we included
both posterior lobe area and shape in the elliptical Fourier coefficients that describe F₁ hybrid male morphology we also obtained a significant result ($F_{14,61} = 2.93, P = 1.83 \times 10^{-3}$). However, although the difference in morphology when both size and shape are analyzed together is statistically significant, the magnitude of this difference is lower than those of either area or shape when each is analyzed individually. Thus, it appears that the nonsignificant test results we obtained using the combined size and shape morphologies for 4C2(A) and Q1(A) might reflect the relative sensitivity of our morphometric assays.