

SUPPLEMENTARY MATERIAL

Covariation among bill traits within birds and sites

When we considered all birds in our study, we found that bill length and width were not significantly correlated ($F_{1,170}=0.48$, $P=0.49$), but bill height was significantly positively correlated with both bill length ($F_{1,170}=5.91$, $P=0.02$) and width ($F_{1,170}=6.60$, $P=0.03$; table 1).

For the ASU campus and downtown Phoenix sites, only bill length and bill height were positively correlated (*Campus*: $\rho=2.95$, $P=0.008$; width vs length: $\rho=0.87$, $P=0.40$, height vs width: $\rho=0.95$, $P=0.35$; *Phoenix*: $\rho=2.14$, $P=0.04$; width vs length: $\rho=1.16$, $P=0.26$, height vs width: $\rho=1.21$, $P=0.24$). In Gilbert, South Mountain, and the Phoenix Zoo, only bill height and width were significantly and positively correlated (*Gilbert*: $\rho=2.10$, $P=0.05$; length vs height: $\rho=0.58$, $P=0.57$; length vs width: $\rho=0.54$, $P=0.59$; *South Mountain*: $\rho=2.70$, $P=0.01$; length vs height: $\rho=0.05$, $P=0.96$; length vs width: $\rho=-0.05$, $P=0.96$; *Zoo*: $\rho=0.19$, $P=0.85$; length vs height: $\rho=0.48$, $P=0.64$; length vs width: $\rho=2.18$, $P=0.04$). Finally, none of the bill metrics were significantly correlated in Chandler, Estrella Mountain, and Mesa (*Chandler*: length vs height: $\rho=1.64$, $P=0.12$; length vs width: $\rho=-0.18$, $P=0.86$; height vs width: $\rho=0.07$, $P=0.95$; *Estrella*: length vs height: $\rho=0.18$, $P=0.86$; length vs width: $\rho=-0.16$, $P=0.87$; height vs width: $\rho=1.00$, $P=0.33$; *Mesa*: length vs height: $\rho=0.99$, $P=0.33$; length vs width: $\rho=0.33$, $P=0.74$; height vs width: $\rho=1.40$, $P=0.18$).

Correlation among song traits within birds and sites

When we considered all birds in our study, we found that at our ASU campus site, the three song characteristics were significantly correlated (low freq. vs high freq.: $\rho=-2.47$, $P=0.04$, low freq. vs freq. range: $\rho=-4.41$, $P=0.002$, high freq. vs freq. range: $\rho=7.72$, $P=10^{-5}$). In Phoenix, the frequency range was correlated with the low frequency ($\rho=-2.48$,

P=0.04) and with the high frequency ($\rho=14.31$, $P=10^{-5}$; low freq. vs High freq.: $\rho=-1.82$, $P=0.11$). In Chandler, Estrella, Gilbert and the zoo, only the high frequency and the frequency range were positively correlated (*Chandler*: $\rho=4.91$, $P=0.001$, low freq. vs high freq: $\rho=-0.05$, $P=0.96$; low freq. vs freq. range: $\rho=-1.30$, $P=0.23$; *Estrella*: $\rho=7.75$, $P=10^{-5}$, low freq. vs high freq: $\rho=-0.26$, $P=0.80$; low freq. vs freq. range: $\rho=-1.17$, $P=0.28$; *Gilbert*: $\rho=12.61$, $P=10^{-5}$, low freq. vs high freq: $\rho=-0.40$, $P=0.70$; low freq. vs freq. range: $\rho=-0.65$, $P=0.53$; *Zoo*: $\rho=18.00$, $P=10^{-6}$, low freq. vs high freq: $\rho=-1.17$, $P=0.18$; low freq. vs freq. range: $\rho=-1.49$, $P=0.17$).