

TABLE S1.—Studies that have used Display Action Patterns (DAP) to graphically illustrate and (usually) quantify interspecific variation of bobbing display structure in lizard genera. Asterisks following citation years indicate studies in which intraspecific population divergence in bobbing displays has been documented.

Genus	Authors
<i>Anolis</i>	Ruibal 1967; Garcia and Gorman 1968; Gorman 1968; Echelle et al., 1971; Jenssen, 1971*, 1977, 1978, 1981*, 1983; Jenssen and Gladson 1984; Lovern et al. 1999*; Macedonia and Stamps 1994; Queral et al. 1995; Macedonia and Clark 2001*, 2003*; Macedonia et al. 2015*, 2019*, 2021*; Ord and Martins 2006; Ord et al. 2007, 2013; Nelson and Ord 2022*; Nelson et al. 2022*
<i>Amphibolurus/ Ctenophorus</i>	Carpenter et al. 1970; Gibbons 1979*; Ramos and Peters 2021
<i>Cyclura</i>	Martins and Lamont 1998*
<i>Diporiphora</i>	Peters et al., 2022
<i>Liolaemus</i>	Martins et al. 2004
<i>Microlophus</i>	Clark et al. 2015, 2016, 2019; Macedonia et al. 2019
<i>Sceloporus</i>	Ferguson 1973*; Carpenter 1978; Martins 1993; Ord and Martins 2006; Martins et al. 1998*, 2015
<i>Urosaurus</i>	Carpenter 1962
<i>Uta</i>	Ferguson 1971*; McKinney 1971

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TABLE S2. Correlation matrices for unit-based variables within each study population. Correlations in bold type are significant at $P < 0.05$ in a Spearman Rank Correlation test for each population. Sixteen adult male *Microlophus bivittatus* subjects on San Cristóbal and 16 on Isla Lobos contributed one mean value for each variable from their two signature displays.

SAN CRISTÓBAL	U1 Dur	U2 Dur	U3 Dur	U4 Dur	U5 Dur	Display Dur	U1 Peak Amp	U3 Peak Amp	U5 Peak Amp
Unit 1 Duration	1								
Unit 2 Duration	0.073	1							
Unit 3 Duration	-0.053	0.243	1						
Unit 4 Duration	0.152	-0.120	-0.321	1					
Unit 5 Duration	0.198	0.407	0.276	0.129	1				
Display Duration	0.324	0.635	0.773	0.017	0.603	1			
Unit 1 Peak Amplitude	0.458	0.505	0.185	0.413	0.371	0.614	1		
Unit 3 Peak Amplitude	-0.184	-0.047	0.190	0.248	0.067	0.137	0.438	1	
Unit 5 Peak Amplitude	0.260	0.073	-0.042	-0.321	-0.241	-0.044	-0.484	-0.682	1
ISLA LOBOS	U1 Dur	U2 Dur	U3 Dur	U4 Dur	U5 Dur	Display Dur	U1 Peak Amp	U3 Peak Amp	U5 Peak Amp
Unit 1 Duration	1								
Unit 2 Duration	0.513	1							
Unit 3 Duration	0.001	-0.288	1						
Unit 4 Duration	-0.123	-0.257	0.155	1					
Unit 5 Duration	0.185	0.139	-0.316	-0.025	1				
Display Duration	0.745	0.709	0.326	0.041	0.183	1			
Unit 1 Peak Amplitude	0.173	0.483	-0.368	-0.528	0.001	0.099	1		
Unit 3 Peak Amplitude	-0.036	-0.121	0.241	-0.286	-0.765	-0.168	0.076	1	
Unit 5 Peak Amplitude	0.108	-0.120	0.157	0.081	0.403	0.139	-0.500	-0.418	1

TABLE S3.—Eigenvalues, percent of variance, and cumulative percent variance

accounted for by four principal components with Eigenvalues > 1.0. Components extracted from 9 unit-based variables (= Display Duration, 5 unit durations, and 3 standardized peak amplitudes) used to measure bobbing display structure in 2 displays of 16 adult male *Microlophus bivittatus* subjects each on San Cristóbal and Isla Lobos.

Principal component	Rotated sums of squared loadings		
	Eigenvalues	Variance %	Cumulative %
PC1	2.050	22.781	22.781
PC2	1.805	20.054	42.834
PC3	1.683	18.695	61.529
PC4	1.540	17.110	78.639

TABLE S4.— Relationships of Varimax-rotated principal components (PCs) to six duration-based measures and three standardized peak amplitude (“peak”) measures of *Microlophus bivittatus* bobbing display structure from 16 adult male subjects each on San Cristóbal and Isla Lobos. Variables with the most heavily weighted factor loadings (absolute value > 0.6) shown in bold.

Variable	Principal Component			
	1	2	3	4
Display Duration	0.972	0.053	0.058	-0.134
Unit 1 Duration	0.714	0.081	0.288	0.202
Unit 3 Peak	0.032	-0.881	-0.018	0.058
Unit 5 Duration	0.368	0.678	0.204	0.147
Unit 5 Peak	0.038	0.636	-0.575	0.070
Unit 1 Peak	0.327	0.005	0.791	0.032
Unit 2 Duration	0.527	0.236	0.574	-0.241
Unit 4 Duration	0.125	-0.086	-0.239	0.911
Unit 3 Duration	0.241	-0.303	-0.406	-0.750

TABLE S5.—Standardized canonical discriminant function coefficients, which show the relative contribution of each principal component (while controlling for the other components) to the discriminant function that classified bobbing displays to population. In this analysis, PC scores were derived from unit-based values from 2 displays of 16 adult male *Microlophus bivittatus* subjects each on San Cristóbal and Isla Lobos.

Discriminant	
PC	Function 1
PC1	0.601
PC2	-0.117
PC3	0.818
PC4	0.293

TABLE S6.— Eigenvalues, percent of variance, and cumulative percent variance accounted for by four principal components with Eigenvalues > 1.0. Components extracted from data means of 9 unit-based variables (= Display Duration, 5 unit durations, and 3 standardized peak amplitudes) used to measure bobbing display structure in 16 adult male subjects each from the San Cristóbal and Isla Lobos populations of *Microlophus bivittatus*.

Principal component	Rotated sums of squared loadings		
	Eigenvalues	Variance %	Cumulative %
PC1	2.246	24.953	24.953
PC2	1.903	21.143	46.096
PC3	1.652	18.354	64.450
PC4	1.530	17.003	81.452

TABLE S7.—Relationships of Varimax-rotated principal components to six duration measures and three standardized peak amplitude measures of *Microlophus bivittatus* bobbing display structure. In this analysis, data were means derived from 2 displays of 16 adult male subjects each on San Cristóbal and Isla Lobos. Variables with the most heavily weighted factor loadings (absolute value > 0.6) shown in bold.

Variable	Principal Component			
	1	2	3	4
Display Duration	0.991	-0.028	0.016	-0.011
Unit 1 Duration	0.668	0.313	0.169	0.462
Unit 2 Duration	0.656	0.456	0.219	-0.409
Unit 1 Peak	0.344	0.785	-0.038	-0.029
Unit 5 Peak	0.029	-0.759	0.383	0.107
Unit 3 Duration	0.352	-0.576	-0.479	-0.469
Unit 3 Peak	0.045	0.245	-0.850	0.080
Unit 5 Duration	0.376	0.030	0.689	0.172
Unit 4 Duration	0.039	-0.112	0.031	0.939

TABLE S8.—Standardized canonical discriminant function coefficients, which show the relative contribution of each principal component (while controlling for the other components) to the discriminant function that classified bobbing displays to population. In this analysis, data were PC scores of unit-based value means derived from 2 displays of 16 adult male subjects each on San Cristóbal and Isla Lobos.

Discriminant	
PC	Function 1
PC1	0.556
PC2	0.876
PC3	0.190
PC4	0.238

TABLE S9. Correlation matrices for DFT variables within each study population. Correlations in bold type are significant at $P < 0.05$ in a Spearman Rank Correlation test for each population. Sixteen adult male *Microlophus bivittatus* subjects on San Cristóbal and 16 on Isla Lobos contributed one mean value for each variable from their two signature displays.

SAN CRISTÓBAL													
Number of Variables = 13													
Observations per variable = 16													
	PrincFreq	LowPeakFreq	MidPeakFreq	HiPeakFreq	LowPartSum	MidPartSum	HiPartSum	LowPercSum	MidPercSum	HiPercSum	LowMeanAmp	MidMeanAmp	HiMeanAmp
Principal Frequency	1												
Low Peak Frequency	0.812	1											
Middle Peak Frequency	-0.288	-0.287	1										
High Peak Frequency	0.384	0.028	0.021	1									
Low Frequency Partial Sum	-0.328	-0.054	0.200	-0.400	1								
Middle Frequency Partial Sum	0.142	0.370	-0.398	0.031	0.156	1							
High Frequency Partial Sum	-0.160	-0.089	0.329	-0.097	0.150	-0.076	1						
Low Freq. Percentage of Sum	-0.407	-0.238	0.225	-0.384	0.760	-0.202	-0.255	1					
Mid. Freq. Percentage of Sum	0.221	0.250	-0.523	0.210	-0.405	0.733	-0.403	-0.338	1				
High Freq. Percentage of Sum	-0.132	-0.166	0.343	0.025	-0.175	-0.275	0.915	-0.370	-0.332	1			
Low Freq. Mean Amplitude	-0.193	-0.003	0.440	-0.044	0.682	0.154	-0.006	0.449	-0.332	-0.241	1		
Middle Freq. Mean Amplitude	0.298	0.332	0.064	0.265	-0.049	0.287	-0.123	-0.378	0.006	-0.229	0.474	1	
High Freq. Mean Amplitude	-0.069	-0.095	0.517	0.166	0.008	-0.349	0.719	-0.255	-0.594	0.715	0.304	0.294	1
ISLOTE LOBOS													
Number of Variables = 13													
Observations per variable = 16													
	PrincFreq	LowPeakFreq	MidPeakFreq	HiPeakFreq	LowPartSum	MidPartSum	HiPartSum	LowPercSum	MidPercSum	HiPercSum	LowMeanAmp	MidMeanAmp	HiMeanAmp
Principal Frequency	1												
Low Peak Frequency	1	1											
Middle Peak Frequency	-0.018	-0.018	1										
High Peak Frequency	0.042	0.042	-0.299	1									
Low Frequency Partial Sum	-0.569	-0.569	-0.08	-0.020	1								
Middle Frequency Partial Sum	0.137	0.137	-0.238	0.422	0.167	1							
High Frequency Partial Sum	-0.141	-0.141	0.127	-0.392	-0.003	-0.302	1						
Low Freq. Percentage of Sum	-0.628	-0.628	0.016	0.058	0.855	0.033	-0.329	1					
Mid. Freq. Percentage of Sum	0.213	0.213	-0.164	0.457	-0.154	0.873	-0.522	-0.044	1				
High Freq. Percentage of Sum	-0.106	-0.106	0.156	-0.393	-0.174	-0.388	0.967	-0.393	-0.487	1			
Low Freq. Mean Amplitude	-0.021	-0.021	0.067	-0.201	0.443	-0.018	0.419	0.225	-0.249	0.324	1		
Middle Freq. Mean Amplitude	0.590	0.590	-0.117	0.220	-0.644	0.513	-0.192	-0.735	0.583	-0.180	-0.304	1	
High Freq. Mean Amplitude	0.226	0.226	0.327	-0.335	-0.398	-0.393	0.857	-0.654	-0.490	0.870	0.244	0.103	1

TABLE S10.—Eigenvalues, percent of variance, and cumulative percent variance

accounted for by five principal components with Eigenvalues > 1.0. Components extracted from 13 DFT variables used to measure bobbing display structure in 2 displays of 16 adult male *Microlophus bivittatus* subjects each from San Cristóbal and Isla Lobos.

Principal component	Rotated sums of squared loadings		
	Eigenvalues	Variance %	Cumulative %
PC1	3.038	23.368	23.368
PC2	2.358	18.138	41.506
PC3	2.310	17.773	59.279
PC4	2.014	15.493	74.771
PC5	1.291	9.927	84.699

TABLE S11.—Relationships of Varimax-rotated principal components to 13 DFT measures of *Microlophus bivittatus* bobbing display structure from subjects on San Cristóbal and Isla Lobos (16 males X 2 populations X 2 displays). Variables with the most heavily weighted factor loadings (absolute value > 0.6) shown in bold.

Variable	Principal Component				
	1	2	3	4	5
High Frequency Partial Sum	0.916	-0.054	-0.076	0.042	0.198
High Frequency Mean Amplitude	0.914	0.231	-0.106	0.137	-0.032
High Frequency % of Sum	0.885	-0.028	-0.164	-0.190	0.228
Low Frequency % of Sum	-0.525	-0.489	-0.307	0.496	0.156
Low Peak Frequency	0.004	0.923	0.036	-0.073	0.139
Principal Frequency	0.048	0.913	0.044	-0.164	-0.071
Middle Frequency Partial Sum	-0.135	-0.038	0.951	0.052	-0.025
Middle Frequency % of Sum	-0.305	-0.020	0.841	-0.325	-0.017
Middle Freq. Mean Amplitude	0.162	0.433	0.725	0.002	-0.262
Low Frequency Mean Amplitude	0.115	-0.019	-0.071	0.930	-0.004
Low Frequency Partial Sum	-0.223	-0.431	-0.063	0.763	0.117
High Peak Frequency	-0.107	-0.043	0.150	0.045	-0.894
Middle Peak Frequency	0.301	-0.023	0.017	0.349	0.516

TABLE S12.—Standardized canonical discriminant function coefficients, which show the relative contribution of each principal component (while controlling for the other components) to the discriminant function that classified bobbing displays to population. In this analysis, DFT-derived principal component scores were from 2 displays of 16 adult male subjects each on San Cristóbal and 16 on Isla Lobos.

Discriminant	
PC	Function 1
PC1	0.526
PC2	0.837
PC3	-0.052
PC4	-0.355
PC5	0.007

TABLE S13.— Eigenvalues, percent of variance, and cumulative percent variance accounted for by four principal components with Eigenvalues > 1.0. Components extracted from data means of 13 DFT variables used to measure bobbing display structure in 16 adult male *Microlophus bivittatus* subjects each on San Cristóbal and Isla Lobos.

Principal component	Rotated sums of squared loadings		
	Eigenvalues	Variance %	Cumulative %
PC1	3.087	23.750	23.750
PC2	3.069	23.607	47.357
PC3	2.286	17.587	64.944
PC4	1.779	13.683	78.627

TABLE S14.—Relationships of Varimax-rotated principal components (PCs) to 13 DFT measures of *Microlophus bivittatus* bobbing display structure. In this analysis, data were means derived from 2 displays of 16 adult male subjects each on San Cristóbal and Isla Lobos. Variables with the most heavily weighted factor loadings (absolute value > 0.6) shown in bold.

Variable	Principal Component			
	1	2	3	4
High Frequency % of Sum	0.934	-0.048	-0.194	-0.138
High Frequency Partial Sum	0.931	-0.082	-0.142	0.091
High Frequency Mean Amplitude	0.867	0.276	-0.274	0.133
Low Peak Frequency	-0.051	0.910	0.050	0.018
Principal Frequency	-0.064	0.890	0.017	-0.133
Middle Freq. Mean Amplitude	0.094	0.701	0.472	0.089
Low Frequency % of Sum	-0.511	-0.693	-0.152	0.405
Middle Frequency Partial Sum	-0.163	0.058	0.916	0.222
Middle Frequency % of Sum	-0.322	0.097	0.856	-0.178
High Peak Frequency	-0.076	0.122	0.457	-0.179
Low Frequency Mean Amplitude	0.090	0.035	-0.056	0.927
Low Frequency Partial Sum	-0.237	-0.600	-0.029	0.666
Middle Peak Frequency	0.346	0.050	-0.348	0.359

TABLE S15.—Standardized canonical discriminant function coefficients, which show the relative contribution of each principal component (while controlling for the other components) to the discriminant function that classified bobbing displays to population. In this analysis, data were PC scores of DFT value means derived from 2 displays of 16 adult male subjects each on San Cristóbal and Isla Lobos.

Discriminant	
PC	Function 1
<hr/>	
PC1	0.456
PC2	0.888
PC3	-0.229
PC4	-0.290
