Supplementary Figures

Figure S1: Maps of the islands. (A) Map of the West Indies with sampled islands highlighted in black. (B) Sampling sites within islands colored after their respective habitat types.
Figure S2: Comparison of dewlap coloration across habitats on Abaco, with extended results. (A–E) Legend as per Figure 2. (F) One-dimensional sensitivity analysis showing the relative importance (mean decrease in accuracy) of the various wavelengths in random forest classification of the whole spectrum. (G) Geographical distance between sites where significant differences were detected in within-island principal component scores (Wilcoxon test, Benjamini-Hochberg correction, $P < 0.05$), including only pairs of sites whose habitats were involved in between-habitat dewlap differences.
Figure S3: Comparison of dewlap coloration across habitats on Bimini. Legend is as per Figure S2.
Figure S4: Comparison of dewlap coloration across habitats on Cayman Brac. Legend is as per Figure S2.
Figure S5: Comparison of dewlap coloration across habitats on Eleuthera. Legend is as per Figure S2.
Figure S6: Comparison of dewlap coloration across habitats on Little Cayman. Legend is as per Figure S2.
Figure S7: Comparison of dewlap coloration across habitats on Long Island. Legend is as per Figure S2.
Figure S8: Comparison of dewlap coloration across habitats on North Andros. Legend is as per Figure S2.
Figure S9: Comparison of dewlap coloration across habitats on Ragged Island. Legend is as per Figure S2, but without panel G.
Figure S10: Comparison of dewlap coloration across habitats on South Andros. Legend is as per Figure S2, but without panel G.
Figure S11: PC1 captures brightness across all islands. (A) Correlation between dewlap brightness (as measured by the mean reflectance from 300 to 700nm in wavelength) and PC1 score across all islands. (B) Correlation between brightness and within-island PC1, for each island. Pearson’s correlation coefficients are reported. *** P < 0.001.
Supplementary Tables

| Island          | Coastal | Coppice | Mangrove |
|-----------------|---------|---------|----------|
| Abaco           | 41      | 24      | 21       |
| Bimini          | 28      | 14      | 15       |
| Cayman Brac     | 15      | 18      | 17       |
| Eleuthera       | 21      | 25      | 9        |
| Little Cayman   | 17      | 12      | 16       |
| Long Island     | 26      | 13      | 14       |
| North Andros    | 9       | 9       | 10       |
| Ragged Island   | 18      | 15      | 17       |
| South Andros    | 10      | 9       | 12       |
Table S2: Proportion of variance explained by the first four principal components on each island, as well as in the PCA performed on all islands together (last row).

| Island         | Total | PC1  | PC2  | PC3  | PC4  |
|----------------|-------|------|------|------|------|
| Abaco          | 0.906 | 0.400| 0.277| 0.149| 0.079|
| Bimini         | 0.919 | 0.530| 0.171| 0.166| 0.052|
| Cayman Brac    | 0.888 | 0.438| 0.190| 0.155| 0.105|
| Eleuthera      | 0.926 | 0.486| 0.235| 0.138| 0.066|
| Little Cayman  | 0.907 | 0.441| 0.212| 0.176| 0.078|
| Long Island    | 0.916 | 0.501| 0.215| 0.152| 0.048|
| North Andros   | 0.952 | 0.485| 0.237| 0.169| 0.062|
| Ragged Island  | 0.907 | 0.483| 0.226| 0.127| 0.072|
| South Andros   | 0.937 | 0.559| 0.172| 0.151| 0.056|
| All islands    | 0.915 | 0.482| 0.189| 0.167| 0.077|
Table S3: Henze-Zirkler’s test of multivariate normality, performed on global principal components (i.e. fitted on data from all islands together) in each habitat and on each island. The number of outlier points detected based on the Mahalanobis distance is reported. $HZ$, test statistic. *, $P < 0.05$; **, $P < 0.01$; ***,$ P < 0.001$.

| Island     | Habitat     | Outliers | $HZ$   | $P$  |
|------------|-------------|----------|--------|------|
| Abaco      | coastal     | 0        | 1.097  | 0.0028 ** |
| Abaco      | coppice     | 0        | 1.091  | 0.0016 ** |
| Abaco      | mangrove    | 0        | 1.052  | 0.0028 ** |
| Bimini     | coastal     | 0        | 0.965  | 0.0199 *  |
| Bimini     | coppice     | 0        | 0.828  | 0.0667 |
| Bimini     | mangrove    | 0        | 1.211  | < 0.0001 *** |
| Cayman Brac| coastal     | 0        | 0.648  | 0.5261 |
| Cayman Brac| coppice     | 0        | 0.691  | 0.4287 |
| Cayman Brac| mangrove    | 0        | 0.671  | 0.4838 |
| Eleuthera  | coastal     | 0        | 1.446  | < 0.0001 *** |
| Eleuthera  | coppice     | 0        | 1.479  | < 0.0001 *** |
| Eleuthera  | mangrove    | 0        | 0.592  | 0.5556 |
| Little Cayman| coastal   | 0        | 0.626  | 0.6547 |
| Little Cayman| coppice   | 0        | 0.637  | 0.4895 |
| Little Cayman| mangrove | 0        | 0.867  | 0.0454 *  |
| Long Island| coastal     | 0        | 0.834  | 0.1291 |
| Long Island| coppice     | 0        | 1.001  | 0.0034 ** |
| Long Island| mangrove    | 0        | 0.907  | 0.0197 *  |
| North Andros| coastal    | 0        | 0.747  | 0.1123 |
| North Andros| coppice    | 0        | 0.644  | 0.3623 |
| North Andros| mangrove  | 0        | 0.839  | 0.0345 *  |
| Ragged Island| coastal   | 0        | 0.757  | 0.2233 |
| Ragged Island| coppice   | 0        | 0.810  | 0.0944 |
| Ragged Island| mangrove  | 0        | 0.524  | 0.9341 |
| South Andros| coastal    | 0        | 0.722  | 0.1765 |
| South Andros| coppice   | 0        | 0.628  | 0.4212 |
| South Andros| mangrove  | 0        | 0.684  | 0.3250 |

38
Table S4: Shapiro-Wilk’s test of univariate normality of the standardized residuals from OLS and GLS-ANOVAs performed on each island where significant differences were detected by random forest classification. \( W \), test statistic. *, \( P_{adj} < 0.05 \); **, \( P_{adj} < 0.01 \); ***, \( P_{adj} < 0.001 \).

| Island         | Variable | \( W \)  | \( P \)  | \( P_{adj} \) |
|----------------|----------|----------|----------|--------------|
| Abaco          | PC1      | 0.962    | 0.0128   | 0.0599       |
| Abaco          | PC2      | 0.960    | 0.0093   | 0.0518       |
| Abaco          | PC3      | 0.982    | 0.2963   | 0.6455       |
| Abaco          | PC4      | 0.983    | 0.3168   | 0.6455       |
| Bimini         | PC1      | 0.918    | 0.0099   | 0.0125 *     |
| Bimini         | PC2      | 0.985    | 0.7104   | 0.7956       |
| Bimini         | PC3      | 0.976    | 0.2997   | 0.6455       |
| Bimini         | PC4      | 0.977    | 0.3529   | 0.6455       |
| Cayman Brac    | PC1      | 0.986    | 0.8236   | 0.8869       |
| Cayman Brac    | PC2      | 0.989    | 0.9299   | 0.9299       |
| Cayman Brac    | PC3      | 0.934    | 0.0079   | 0.0518       |
| Cayman Brac    | PC4      | 0.981    | 0.5926   | 0.7214       |
| Eleuthera      | PC1      | 0.936    | 0.0058   | 0.0518       |
| Eleuthera      | PC2      | 0.972    | 0.2199   | 0.6455       |
| Eleuthera      | PC3      | 0.981    | 0.5224   | 0.6965       |
| Eleuthera      | PC4      | 0.977    | 0.3689   | 0.6455       |
| Little Cayman  | PC1      | 0.955    | 0.0821   | 0.3094       |
| Little Cayman  | PC2      | 0.982    | 0.6854   | 0.7956       |
| Little Cayman  | PC3      | 0.891    | 0.0005   | 0.0125 *     |
| Little Cayman  | PC4      | 0.977    | 0.4858   | 0.6965       |
| Long Island    | PC1      | 0.978    | 0.4223   | 0.6956       |
| Long Island    | PC2      | 0.980    | 0.5161   | 0.6965       |
| Long Island    | PC3      | 0.981    | 0.5605   | 0.7134       |
| Long Island    | PC4      | 0.976    | 0.3580   | 0.6455       |
| North Andros   | PC1      | 0.936    | 0.0884   | 0.3094       |
| North Andros   | PC2      | 0.966    | 0.4735   | 0.6965       |
| North Andros   | PC3      | 0.982    | 0.8977   | 0.9299       |
| North Andros   | PC4      | 0.999    | 0.3348   | 0.6455       |
| Island          | Longitude | Latitude | Habitat     | PC1     | PC2     | PC3     | PC4     |
|----------------|-----------|----------|-------------|---------|---------|---------|---------|
| Abaco          | -77.7     | 26.9     | mangrove    | 1.005   | -0.116  | 0.063   | -1.255  |
| Abaco          | -77.6     | 26.9     | coastal     | 0.157   | -0.531  | -0.086  | -2.034  |
| Abaco          | -77.6     | 26.9     | coppice     | -0.081  | -0.034  | -0.631  | -0.633  |
| Abaco          | -77.2     | 26.1     | coastal     | 0.296   | 0.091   | 0.987   | -0.158  |
| Abaco          | -77.0     | 26.3     | mangrove    | -0.312  | 1.224   | -0.898  | 0.208   |
| Abaco          | -77.0     | 26.3     | coppice     | 0.094   | -0.314  | -0.120  | 0.482   |
| Abaco          | -77.0     | 26.3     | coastal     | -0.334  | -0.748  | 0.201   | 0.534   |
| Bimini         | -79.3     | 25.7     | coastal     | 0.399   | 0.000   | 0.304   | -0.049  |
| Bimini         | -79.3     | 25.7     | coppice     | -0.299  | 0.511   | -0.657  | 0.097   |
| Cayman Brac    | -79.9     | 19.7     | coastal     | 0.483   | -0.523  | -0.781  | 0.443   |
| Cayman Brac    | -79.8     | 19.7     | mangrove    | 0.219   | 0.453   | 0.810   | -0.015  |
| Cayman Brac    | -79.8     | 19.7     | coppice     | -0.610  | 0.008   | -0.114  | -0.355  |
| Eleuthera      | -76.3     | 24.8     | coppice     | 0.170   | -0.855  | -0.042  | 0.086   |
| Eleuthera      | -76.3     | 24.8     | coastal     | 0.503   | -0.653  | 0.564   | -0.587  |
| Eleuthera      | -76.3     | 24.8     | mangrove    | 0.067   | -0.694  | -0.119  | 0.718   |
| Eleuthera      | -76.2     | 24.9     | coppice     | -0.353  | 0.595   | -0.544  | -0.535  |
| Eleuthera      | -76.1     | 24.9     | coastal     | -0.215  | 1.220   | 0.297   | 0.396   |
| Little Cayman  | -80.1     | 19.7     | coppice     | -0.621  | 0.614   | -0.179  | -0.404  |
| Little Cayman  | -80.0     | 19.7     | coastal     | 0.395   | 0.355   | 0.743   | 0.175   |
| Little Cayman  | -80.0     | 19.7     | mangrove    | 0.047   | -0.838  | -0.655  | 0.118   |
| Long Island    | -75.2     | 23.5     | mangrove    | -0.390  | 0.217   | 0.541   | 0.535   |
| Long Island    | -75.2     | 23.4     | coastal     | 0.038   | -0.807  | 0.015   | -0.326  |
| Long Island    | -75.2     | 23.4     | coppice     | 0.894   | 0.018   | 0.035   | -0.161  |
| Long Island    | -75.1     | 23.4     | coastal     | -0.408  | 0.299   | -0.512  | -0.134  |
| North Andros   | -77.9     | 24.8     | coastal     | -0.152  | -0.074  | -0.104  | -0.957  |
| North Andros   | -77.8     | 24.8     | coppice     | 0.112   | 0.860   | -0.258  | 0.621   |
| North Andros   | -77.8     | 24.7     | mangrove    | 0.036   | -0.707  | 0.326   | 0.303   |
| Ragged Island  | -75.7     | 22.2     | coppice     | 0.269   | -0.440  | 0.088   | -0.360  |
| Ragged Island  | -75.7     | 22.2     | coastal     | -0.049  | -0.076  | 0.221   | 0.029   |
| Ragged Island  | -75.7     | 22.2     | mangrove    | -0.246  | 0.273   | -0.118  | 0.933   |
| Ragged Island  | -75.7     | 22.2     | mangrove    | -0.099  | 0.749   | -0.588  | -0.636  |
| South Andros   | -77.6     | 24.2     | mangrove    | 0.384   | 0.492   | -0.333  | 0.472   |
| South Andros   | -77.6     | 24.1     | coppice     | 0.067   | -0.211  | 0.358   | -0.018  |
| South Andros   | -77.5     | 24.1     | coastal     | -0.520  | -0.401  | 0.078   | -0.550  |
Table S6: Nonparametric Kruskal-Wallis tests performed on each variable on each island where deviations from normality were detected. *, $P < 0.05$; **, $P < 0.01$; ***, $P < 0.001$.

| Island      | Variable | $\chi^2$ | df | $P$         |
|-------------|----------|----------|----|------------|
| Bimini      | PC1      | 9.31     | 2  | 0.0095 **  |
| Little Cayman| PC3      | 19.95    | 2  | < 0.0001 ***|
Table S7: Support vector machine classification results. Legend is as per Table 1.

| Island       | N  | Score | P          |
|--------------|----|-------|------------|
| Abaco        | 86 | 0.614 | < 0.0001   | ***        |
| Bimini       | 57 | 0.474 | 0.0098     | **         |
| Cayman Brac  | 50 | 0.732 | < 0.0001   | ***        |
| Eleuthera    | 55 | 0.476 | 0.0112     | *          |
| Little Cayman| 45 | 0.724 | < 0.0001   | ***        |
| Long Island  | 53 | 0.623 | < 0.0001   | ***        |
| North Andros | 28 | 0.721 | < 0.0001   | ***        |
| Ragged Island| 50 | 0.368 | 0.2874     |            |
| South Andros | 31 | 0.445 | 0.1152     |            |
Table S8: Linear discriminant analysis classification results. Legend is as per Table 1.

| Island          | N  | Score | P      |
|-----------------|----|-------|--------|
| Abaco           | 86 | 0.670 | < 0.0001 *** |
| Bimini          | 57 | 0.491 | 0.0046 ** |
| Cayman Brac     | 50 | 0.736 | < 0.0001 *** |
| Eleuthera       | 55 | 0.480 | 0.0112 * |
| Little Cayman   | 45 | 0.747 | < 0.0001 *** |
| Long Island     | 53 | 0.562 | 0.0004 *** |
| North Andros    | 28 | 0.636 | 0.0008 *** |
| Ragged Island   | 50 | 0.388 | 0.1964 |
| South Andros    | 31 | 0.458 | 0.0589 |