**Table S1.** Original behavioral elements used in BORIS logging. *N* gives number of occurrences in raw dataset.

|  |  |  |  |
| --- | --- | --- | --- |
| **Element** | **N** | **Classification** | |
| Attempted Copulation | 11 | Excluded | Non-display |
| Bird2 ALAD | 55 | Excluded | Multiple male performers |
| Bird2 BowLeft | 695 | Excluded | Multiple male performers |
| Bird2 BowRight | 677 | Excluded | Multiple male performers |
| Bird2 Half-bow Left | 26 | Excluded | Multiple male performers |
| Bird2 Half-bow Right | 21 | Excluded | Multiple male performers |
| Bird2 HeadDownBowing | 56 | Excluded | Multiple male performers |
| Bird2 Mixed Element | 13 | Excluded | Multiple male performers |
| Bird2 NeckTwist | 1693 | Excluded | Multiple male performers |
| Bird2 On-log NO display | 79 | Excluded | Multiple male performers |
| Bird2 SLAD | 1 | Excluded | Multiple male performers |
| Bird2 TafLF\_Off | 28 | Excluded | Multiple male performers |
| Bird2 TafLF\_On | 26 | Excluded | Multiple male performers |
| Copulation | 24 | Excluded | Non-display |
| End | 486 | Excluded | Tracking |
| Female Looking Away | 1736 | Excluded | Female response |
| Female Movement | 978 | Excluded | Movement |
| Female Off Log | 320 | Excluded | Movement |
| Female On Log | 320 | Excluded | Movement |
| Female ResponseToALAD | 188 | Excluded | Female response |
| Female Tracking Male | 1924 | Excluded | Female response |
| FemaleSwitch | 406 | Excluded | Movement |
| Male1 ALAD | 1104 | Retained |  |
| Male1 BowLeft | 8088 | Partial | only retained Male1 Bow |
| Male1 BowRight | 7950 | Retained |  |
| Male1 Half-bow Left | 296 | Partial | only retained Male1 Half-bow Right |
| Male1 Half-bow Right | 258 | Retained |  |
| Male1 HeadDownBowing | 2360 | Retained |  |
| Male1 Metronome\_Left | 11 | Partial | only retained Male1 Metronome Right |
| Male1 Metronome\_Right | 25 | Retained |  |
| Male1 Mixed Element | 361 | Retained |  |
| Male1 NeckTwist | 5618 | Retained |  |
| Male1 Off Log | 41 | Excluded | Movement |
| Male1 On Log | 39 | Excluded | Movement |
| Male1 On Log No Display | 2225 | Retained | Movement |
| Male1 Other Behavior | 2142 | Partially retained | Excluded if specified as  “Vocalization” or “Gardening” |
| Male1 SLAD | 655 | Retained |  |
| Male1 Switch | 1145 | Retained |  |
| Male1 TafLF\_Off | 1193 | Partial | only retained Male1 TafLF\_On |
| Male1 TafLF\_On | 1223 | Retained |  |
| Start | 486 | Excluded | Tracking |

**Table S2**. Individual male display activity. The number of displays given by the individual (SOLO, AUDI, COP) and observation date ranges are given from our final dataset. Band IDs were assigned by the unique suffix on an individual aluminum leg band.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Band ID** | **Date banded** | **Plumage at banding** | **SOLO** | **AUDI** | **COP** | **First seen** | **Last seen** |
| 112 | 2017-09-23 | Definitive | 13 | 11 | 0 | 2017-10-03 | 2017-12-20 |
| 113 | 2017-09-17 | Definitive | 5 | 0 | 0 | 2017-11-10 | 2017-11-20 |
| 296 | 2015-07-10 | Definitive | 122 | 41 | 9 | 2016-06-24 | 2017-12-20 |
| 299 | 2017-10-25 | Definitive | 10 | 2 | 0 | 2017-11-10 | 2017-11-27 |
| 940 | 2013-05-26 | Definitive | 2 | 4 | 1 | 2015-01-01 | 2015-01-14 |
| 948 | 2013-06-10 | Predefinitive | 1 | 1 | 0 | 2016-08-15 | 2016-08-15 |
| 965 | 2014-07-03 | Definitive | 19 | 4 | 0 | 2015-08-06 | 2017-10-02 |
| 976 | 2014-07-22 | Predefinitive | 1 | 1 | 0 | 2016-07-30 | 2016-07-30 |
| 978 | 2014-07-23 | Definitive | 0 | 2 | 0 | 2015-08-12 | 2015-08-19 |
| 980 | 2014-07-24 | Definitive | 71 | 18 | 3 | 2015-08-08 | 2017-12-20 |
| *Unk* |  |  | 7 | 5 | 0 | 2015-08-23 | 2017-10-25 |

**Table S3.** Individual female audience activity. The number of displays attended by the individual (AUDI, COP), observation date ranges, and the ID of males viewed or copulated with are given from our final dataset. Band IDs were assigned by the unique suffix on an individual aluminum leg band. Unknown birds were either suspected female, predefinitive male, or completely unknown given observed plumage and behavior.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Band ID** | **Date banded** | **AUDI** | **COP** | **First seen** | **Last seen** | **Males viewed** | **Males copulated** |
| 118 | 2017-09-29 | 1 | 0 | 2017-12-07 | 2017-12-07 | 112 |  |
| 289 | 2015-07-28 | 7 | 0 | 2017-10-09 | 2017-12-20 | 112, 980 |  |
| 292 | 2015-07-26 | 1 | 0 | 2015-08-23 | 2015-08-23 | *Unk* |  |
| 294 | 2015-07-19 | 6 | 0 | 2015-08-23 | 2017-11-21 | 296 |  |
| 295 | 2015-07-14 | 1 | 1 | 2015-08-23 | 2017-12-08 | 296, *Unk* | 296 |
| 935 | 2013-05-28 | 3 | 0 | 2016-07-30 | 2017-12-02 | 112, 296, 976 |  |
| 936 | 2013-05-26 | 0 | 2 | 2017-11-15 | 2017-12-10 | 296 | 296 |
| 959 | 2015-01-06 | 0 | 1 | 2017-12-06 | 2017-12-06 | 296 | 296 |
| 972 | 2014-07-15 | 1 | 0 | 2017-10-26 | 2017-10-26 | 980 |  |
| 981 | 2016-07-06 | 7 | 0 | 2016-08-15 | 2017-12-15 | 112, 296, 299  948, 965 |  |
| 984 | 2014-07-28 | 1 | 0 | 2017-11-26 | 2017-11-26 | 296 |  |
| 988 | 2014-08-03 | 1 | 0 | 2015-01-10 | 2015-01-10 | 940 |  |
| *Female?* |  | 26 | 8 | 2015-01-01 | 2017-12-20 | 112, 296, 940,  965, 980, *Unk* | 296;980 |
| *Male?* |  | 21 | 0 | 2017-10-25 | 2017-12-20 | 112, 296, 299  980 |  |
| *Unk* |  | 18 | 1 | 2015-01-01 | 2017-12-20 | 112, 296, 940  978, 980 | 940 |

**Table S4.** Coded display strings for *Masius* displays that resulted in successful copulation (COP displays). Copulation occurred after the last display element. Total duration (seconds), length (number of elements), entropy (scaled), and compression (ratio of uncompressed to compressed string lengths) given for each display. See Main Text Table 1 or Table S5 for behavioral codes.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Male** | **Date** | **Duration** | **Length** | **Entropy** | **Compression** | **Coded display string** |
| 1455 | 296 | 2017-11-15 | 187 | 79 | 0.22 | 4.4 | IIDDDDDDDEDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDEB |
| 1533 | 296 | 2017-11-19 | 128 | 66 | 0.11 | 4.7 | DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD DDDDDDDDDDDDDDDDDDDDDDDDDB |
| 1558 | 296 | 2017-11-20 | 143 | 78 | 0.12 | 4.6 | EDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDB |
| 1817 | 296 | 2017-12-05 | 84 | 46 | 0.26 | 3.1 | IIDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD DDDDDB |
| 1824 | 296 | 2017-12-06 | 97 | 77 | 0.63 | 2.7 | IIIIIIIIIIIDDDIIIIIIIIDDDIIIIIIIIDDDDDDD DDDDDDIIIIIIIIIIIIIDDDDDIIIIIIIIIIIDB |
| 1878 | 296 | 2017-12-08 | 134 | 79 | 0.40 | 3.2 | JJHHHHHHIIIIDDDDDDDDDDDDDDDDDDDDDDDDDDDD DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDB |
| 1920 | 296 | 2017-12-10 | 86 | 45 | 0.19 | 3 | IDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD DDDDB |
| 1987 | 296 | 2017-12-13 | 96 | 39 | 0.51 | 2 | IIDDDDDDDDDDDDDDDDDDDDDDDDDDDDJJJIIDDDB |
| 2020 | 296 | 2017-12-15 | 213 | 71 | 0.13 | 4.7 | DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD DDDDDDDDDDDDDDDDDDDDDDDDDLDDDDB |
| 5005 | 940 | 2015-01-14 | 70 | 35 | 0.24 | 2.3 | IDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDB |
| 989 | 980 | 2017-10-26 | 138 | 52 | 0.14 | 3.7 | DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD DDDDDDDDDDDB |
| 991 | 980 | 2017-10-26 | 127 | 69 | 0.3 | 4.6 | IIIIIDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD DDDDDDDDDDDDDDDDDDDDDDDDDDDDB |
| 992 | 980 | 2017-10-26 | 132 | 69 | 0.14 | 4.6 | IDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD DDDDDDDDDDDDDDDDDDDDDDDDDDDDB |

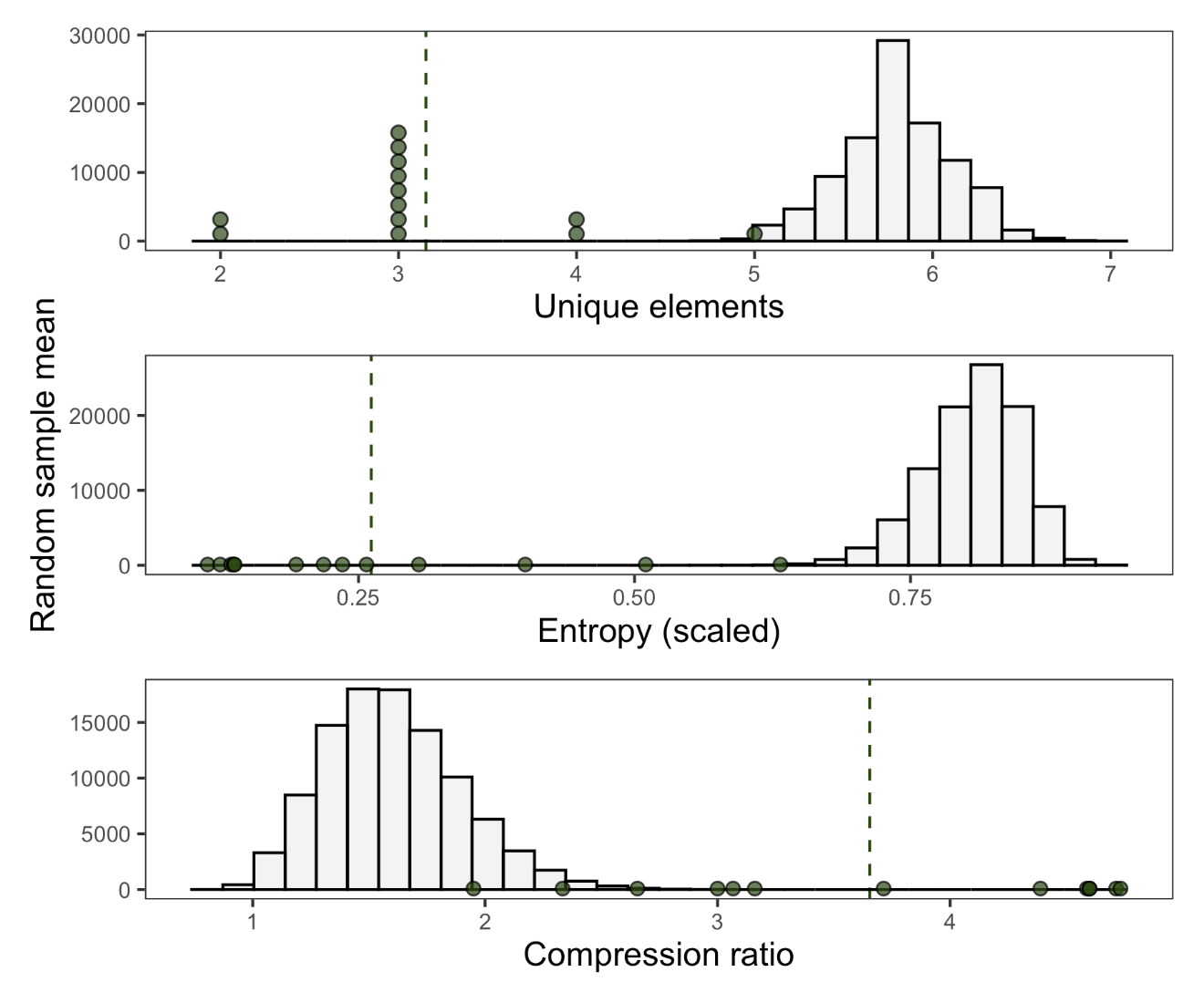
**Table S5.** Behavioral element frequencies across all displays (SOLO, AUDI, or COP) in the final dataset. See Main Text Table 1 for behavioral descriptions.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Element *N*** | **SOLO** | **AUDI** | **COP** |
| A. | Zero | 1605 | 45 | 0 |
| B. | Audible log-approach dive | 687 | 162 | 13 |
| C. | Silent log-approach dive | 440 | 1 | 0 |
| D. | Side-to-side bow | 1603 | 3384 | 706 |
| E. | Half bow | 168 | 17 | 3 |
| F. | Head-down bow | 777 | 1108 | 0 |
| G. | Metronome | 0 | 3 | 0 |
| H. | Position switch | 129 | 669 | 6 |
| I. | Neck twist | 80 | 2991 | 71 |
| J. | To-and-fro flight | 222 | 631 | 5 |
| K. | Mixed | 171 | 5 | 0 |
| L. | Other | 127 | 10 | 1 |

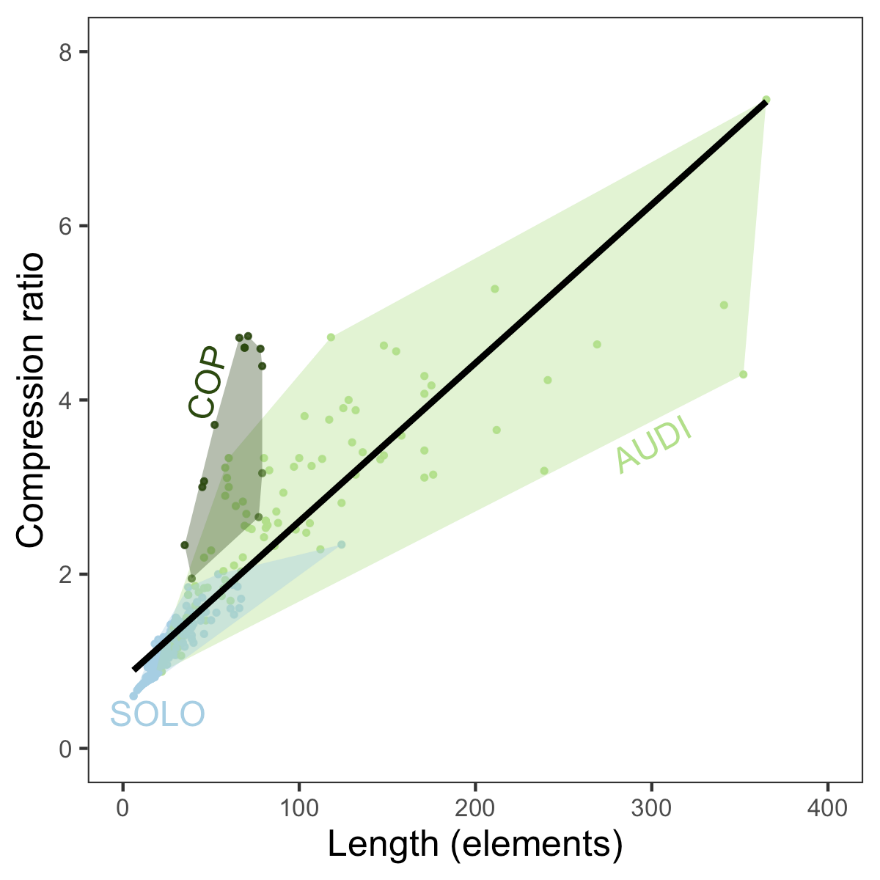
**Chart, histogram

Description automatically generated**

**Figure S1.** Dates of observed *Masius* displays in the final dataset (2015-2017). Observation time was not consistent across the date range.



**Figure S2.** Empirical means from the small sample of COP displays (n = 13), compared to randomized mean values. Distributions show 100,000 mean values, with each mean value calculated from 13 displays drawn randomly, without replacement, from the full dataset. Green points are empirical values, and dashed green line is empirical mean, from COP displays.

****

**Figure S3.** Correlation between display length (total number of elements) and compression ratio (i.e., the ratio of uncompressed display string length to compressed string length).

**COMPARSION OF BEFORE- AND AFTER- COPULATION DISPLAYS**

For our main analyses, we end successful displays (COP) at the first copulation. However, the males in all 13 COP displays continued performing a mixture of elements after first copulation. After-copulation displays featured a both qualitatively and quantitatively different array of behavioral elements as before-copulation displays (Table S6). Side-to-side bows were less frequent, whereas long stretches of Neck twists were far more frequent (Table S6-7). Notably, three elements missing from before-copulation appeared in some displays immediately following copulation: pauses (“Zero”), Head-down bows, and the rare Metronome behavior. Although males performed Half bows, Position switches, and To-and-fro flights in some before-copulation displays, these elements were absent following copulation.

Every after-copulation displays featured either another successful copulation (12/13 after-copulation displays) or an attempted copulation (x/13 after-copulation displays; Table S6-7).

**Table S6.** Behavioral element frequencies in COP displays and after-COP displays (n = 13). Note that elements *M* (Attempted copulation) and *N* (Copulation) are shown here, but were excluded from our main quantitative analyses.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Element *N*** | **Before** | **After** |
| A. | Zero | 0 | 4 |
| B. | Audible log-approach dive | 13 | 12 |
| C. | Silent log-approach dive | 0 | 0 |
| D. | Side-to-side bow | 706 | 166 |
| E. | Half bow | 3 | 0 |
| F. | Head-down bow | 0 | 9 |
| G. | Metronome | 0 | 8 |
| H. | Position switch | 6 | 0 |
| I. | Neck twist | 71 | 387 |
| J. | To-and-fro flight | 5 | 0 |
| K. | Mixed | 0 | 0 |
| L. | Other | 1 | 2 |
| M. | Attempted copulation | 0 | 4 |
| N. | Copulation | 13 | 12 |

**Table S7.** Coded display strings for *Masius* displays that resulted in successful copulation (COP), followed by the display that continued after copulation. See Table S6 for single-character behavior codes.

**COMPARISON OF DISPLAYS FOR FEMALE AND SUSPECTED PREDEFINITIVE MALE AUDIENCES**