*Behavior classification*

We first constructed an ethogram for *Sporophila maximiliani* based on previous observations and on ethograms of other passerines species (Porto and Piratelli 2005; Smith and Wassmer 2016). All behaviors identified are described in Table 1.

The classification of behaviors into these two classifications was based on the literature register in birds. As displacement activity are mostly maintenance behaviors, all behaviors of this category that were not rare were included in the statistical analysis (Delius 1988). Furthermore, ingestion and locomotion behaviors could also appear as a displacement activity depend on the context (Dawkins et al. 1991), so we conducted a PCA Analysis of all behaviors to identify other behaviors which most contribute to the variability of the data, since the variability in the display of out of context behaviors between treatments could indicate a case of displacement behavior (Table 2). As a signal of aggressiveness, we considered either direct confront behavior or alert behavior, as a behavior that precedes the attack and is associated with an active copy strategy (Maestripieri et al. 1992; Steimer 2002). We also considered calls as a possible signal of aggressiveness (Morton, 1977).

We considered all behaviors that were displayed by less than 30% of the individuals as rare behaviors and excluded them from the analysis. The “Flight” and “Jumping laterally” behaviors were also excluded from the analyses because these behaviors presented a high correlation with “Jump between perches” and “Autopreening”, respectively.

After this classification, we constructed a new table with only the behavior of interest to our hypotheses (Table 1 of the article).

**Table 1** Ethogram of *Sporophila maximiliani*

| **Category** | **Behavior** | **Description** |
| --- | --- | --- |
| Maintenance | - Autopreening | Handling feathers using the bill |
| - Bill cleaning | Scraping the bill repeatedly on the perch |
| - Flapping of wings\* | Opening and flapping both wings simultaneously or alternately standing on the perch |
| - Bill opening | Opening of the bill |
| - Feather settling | Shake of the body while rapidly erecting the feathers. |
| Locomotion | - Flight | Flight short distances |
| - Jump between perches | Jump between perches and/or among other types of support (cage, feeder or floor) |
| - Walking on the perch\* | Walking laterally and moving around on the perch |
| - Jumping laterally | Jumping sideways on the perch |
| Ingestion/egestion | - Eating | Handling and eating food |
| - Foraging\* | Search for food on the ground or on perch |
| - Defecation | Lifts tail feathers, tilts the body slightly and eliminate feces |
| - Drinking\* | Dip the bill inside the water container and tilts its head up to shallow |
| Alert | - Vigilance | Turn the head and/or body quickly in any direction for observation |
| - Perch in the cage | Landing on cage bars and quickly leave |
| - Jump on the perch changing orientation | Jumping on the perch by changing the side the body is oriented |
| - Stretching neck | Stretch the body and neck vertically, getting bigger |
| Vocalization | - Singing\* | Emission of long and complex vocalization |
| - Call | Emission of short calls or confrontation vocalization |
| Resting | - Perching | Stand on the perch in the same position and with the head in the same direction of the body to rest |
| Agonistic behavior | Confrontation\* | Flight towards the playback source |

\* rare behaviors (i.e, those behaviors displayed by less than 30% of the total individuals observed) that were not included in the statistical analysis**.**

**Table 2.** PCA values of variability of ten first variables between treatments. The behaviors outside maintenance behaviors that most contribute to dimension 1 or 2 variability are bold in the table.

| Variable | Dim.1 | ctr | cos2 | Dim.2 | ctr | cos2 | Dim.3 | ctr | cos3 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| t\_limp | 0.075 | 0.235 | 0.006 | 0.328 | 5.442 | 0.108 | 0.887 | 42.208 | 0.788 |
| n\_limb | -0.116 | 0.553 | 0.013 | -0.536 | 14.506 | 0.287 | 0.245 | 3.204 | 0.060 |
| n\_bat | 0.399 | 6.566 | 0.159 | 0.123 | 0.767 | 0.015 | -0.158 | 1.346 | 0.025 |
| n\_abeb | -0.364 | 5.483 | 0.133 | -0.006 | 0.002 | 0.000 | -0.082 | 0.362 | 0.007 |
| n\_trec | 0.167 | 1.151 | 0.028 | 0.291 | 4.288 | 0.085 | 0.900 | 43.441 | 0.810 |
| **n\_pulp** | **0.521** | 11.202 | 0.271 | -0.152 | 1.164 | 0.023 | 0.031 | 0.051 | 0.001 |
| **t\_com** | -0.052 | 0.111 | 0.003 | **-0.852** | 36.673 | 0.726 | 0.174 | 1.628 | 0.030 |
| **n\_def** | **0.513** | 10.852 | 0.263 | 0.039 | 0.078 | 0.002 | -0190 | 1.931 | 0.036 |
| n\_empg | 0.800 | 26.413 | 0.639 | 0.007 | 0.003 | 0.000 | -0.072 | 0.275 | 0.005 |
| t\_obs | -0224 | 2.072 | 0.050 | 0.083 | 34.914 | 0.689 | -0.274 | 4.036 | 0.075 |

Variables

Dim.1 ctr cos2 Dim.2 ctr cos2 Dim.3 ctr cos2

n\_limb | 0.681 18.540 0.463 | -0.081 0.359 0.006 | 0.364 9.178 0.133 |

n\_abeb | 0.119 0.563 0.014 | 0.240 3.180 0.058 | 0.770 40.975 0.592 |

n\_trec | 0.327 4.284 0.107 | 0.213 2.515 0.046 | 0.603 25.173 0.364 |

n\_pulp | **0.759** 23.030 0.575 | -0.043 0.103 0.002 | -0.207 2.954 0.043 |

t\_com | 0.298 3.566 0.089 | **-0.803** 35.595 0.645 | -0.009 0.005 0.000 |

t\_obs | -0.172 1.182 0.030 | 0.936 48.384 0.877 | -0.212 3.111 0.045 |

n\_pulo | 0.814 26.531 0.663 | 0.106 0.618 0.011 | -0.340 7.995 0.116 |

n\_estp | 0.486 9.451 0.236 | 0.281 4.368 0.079 | 0.141 1.379 0.020 |

n\_vocc | 0.290 3.371 0.084 | 0.118 0.774 0.014 | -0.224 3.467 0.050 |

t\_rel | **-0.487** 9.484 0.237 | -0.273 4.104 0.074 | 0.289 5.763 0.083 |