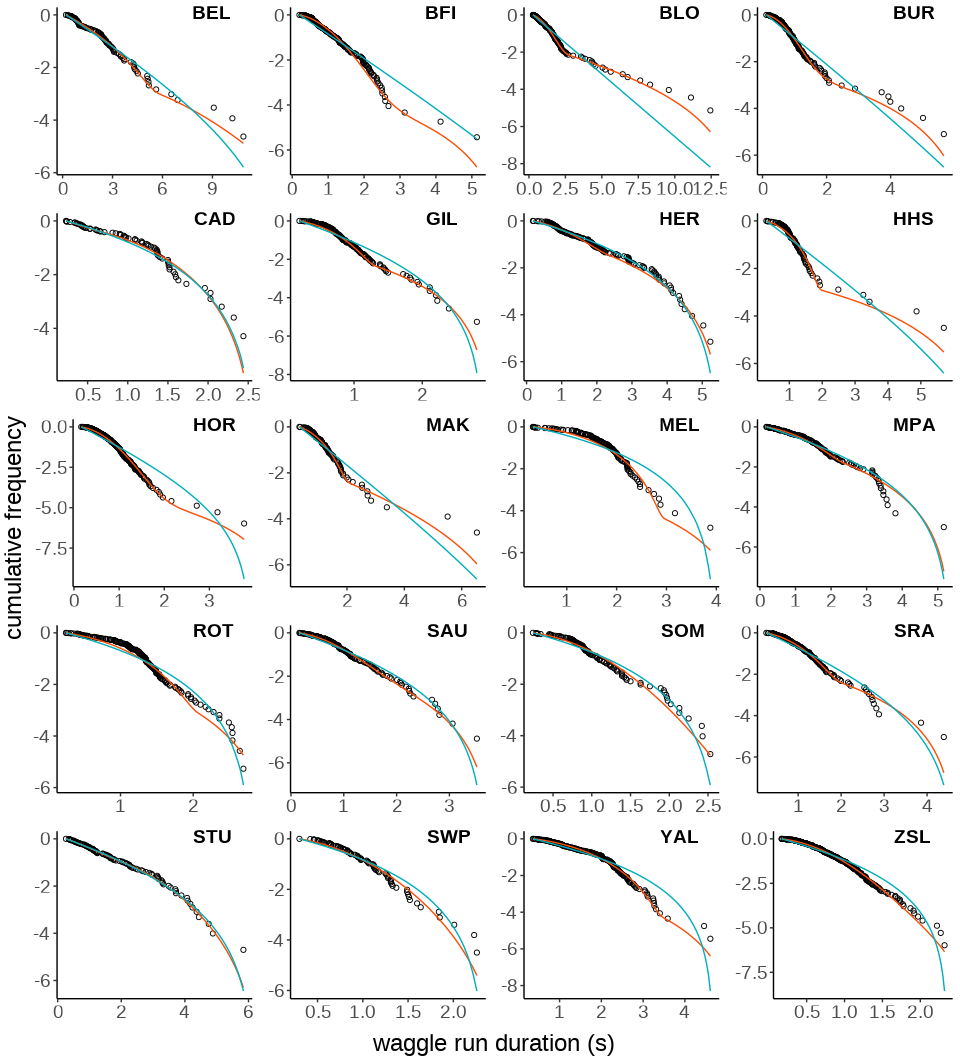
Waggle dance distributions quantify collective foraging in honey bee colonies: Supplementary material

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# Waggle dance model

# Waggle dance model fit



Supplementary Fig 1. log Compliment cumulative frequency distribution of waggle dance durations and fits of the collective (red line) and individual (blue line) models for all 20 sites.

Table 1. shows the results of the model fitting, including likelihood scores, parsimony measures -AIC, delta\_AIC, rAIC (relative delta\_AIC) and wAIC (Akaike weights)- and goodness of fit -Ks statistics (ks\_statistic, ks\_pvalue)- for all 20 sites.

**Table** : Fit results for the fitting of the waggle dance model to each site.

| **site** | **model** | **MLE** | **AIC** | **ΔAIC** | **rAIC** | **wAIC** | **p** | **bs** | **br** | **as** | **ar** | **D** | **p\_value** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| BEL | collective | -180.851 | 371.702 | 0.700 | 0.705 | 0.413 | 0.892 | 0.231 | 5.150 | 0.171 | 0.035 | 0.078 | 0.904 |
| BEL | individual | -183.501 | 371.002 | 0.000 | 1.000 | 0.587 | 1.000 | 4.495 |  | 0.073 |  | 0.088 | 0.812 |
| BFI | collective | -190.499 | 390.998 | 0.000 | 1.000 | 1.000 | 0.045 | 0.000 | 2.769 | 0.164 | 0.249 | 0.087 | 0.329 |
| BFI | individual | -211.297 | 426.593 | 35.596 | 0.000 | 0.000 | 1.000 | 9.470 |  | 0.100 |  | 0.183 | 0.001 |
| BLO | collective | -221.026 | 452.052 | 0.000 | 1.000 | 1.000 | 0.209 | 1.786 | 0.571 | 0.068 | 0.359 | 0.071 | 0.775 |
| BLO | individual | -237.389 | 478.778 | 26.726 | 0.000 | 0.000 | 1.000 | 5 505.000 |  | 0.000 |  | 0.112 | 0.197 |
| BUR | collective | -118.305 | 246.609 | 0.000 | 1.000 | 1.000 | 0.112 | 0.000 | 500.000 | 0.151 | 0.028 | 0.067 | 0.833 |
| BUR | individual | -143.718 | 291.435 | 44.826 | 0.000 | 0.000 | 1.000 | 10.000 |  | 0.100 |  | 0.177 | 0.013 |
| CAD | collective | -48.278 | 106.556 | 2.650 | 0.266 | 0.210 | 0.166 | 0.000 | 0.425 | 1.456 | 0.386 | 0.082 | 0.943 |
| CAD | individual | -49.953 | 103.906 | 0.000 | 1.000 | 0.790 | 1.000 | 0.000 |  | 0.385 |  | 0.110 | 0.747 |
| GIL | collective | -74.541 | 159.082 | 0.000 | 1.000 | 1.000 | 0.261 | 0.000 | 0.000 | 0.335 | 0.754 | 0.130 | 0.064 |
| GIL | individual | -102.309 | 208.618 | 49.536 | 0.000 | 0.000 | 1.000 | 2.037 |  | 0.345 |  | 0.198 | 0.001 |
| HER | collective | -235.180 | 480.360 | 0.000 | 1.000 | 0.984 | 0.638 | 0.000 | 0.000 | 0.178 | 0.429 | 0.110 | 0.230 |
| HER | individual | -242.322 | 488.644 | 8.284 | 0.016 | 0.016 | 1.000 | 0.548 |  | 0.183 |  | 0.140 | 0.072 |
| HHS | collective | -61.348 | 132.696 | 0.000 | 1.000 | 1.000 | 0.095 | 0.000 | 0.000 | 0.141 | 0.503 | 0.133 | 0.369 |
| HHS | individual | -83.749 | 171.498 | 38.802 | 0.000 | 0.000 | 1.000 | 7.095 |  | 0.125 |  | 0.244 | 0.009 |
| HOR | collective | -146.040 | 302.081 | 0.000 | 1.000 | 1.000 | 0.022 | 0.000 | 10.000 | 0.213 | 0.203 | 0.066 | 0.335 |
| HOR | individual | -213.584 | 431.168 | 129.087 | 0.000 | 0.000 | 1.000 | 4.343 |  | 0.255 |  | 0.185 | 0.000 |
| MAK | collective | -84.519 | 179.038 | 0.000 | 1.000 | 1.000 | 0.209 | 2.319 | 0.020 | 0.122 | 0.478 | 0.091 | 0.770 |
| MAK | individual | -98.025 | 200.049 | 21.012 | 0.000 | 0.000 | 1.000 | 9.168 |  | 0.096 |  | 0.192 | 0.048 |
| MEL | collective | -115.316 | 240.633 | 0.000 | 1.000 | 1.000 | 0.079 | 0.000 | 0.000 | 0.213 | 0.338 | 0.163 | 0.078 |
| MEL | individual | -135.731 | 275.462 | 34.829 | 0.000 | 0.000 | 1.000 | 0.000 |  | 0.252 |  | 0.244 | 0.001 |
| MPA | collective | -181.873 | 373.746 | 0.000 | 1.000 | 0.959 | 0.567 | 0.578 | 0.000 | 0.185 | 0.420 | 0.067 | 0.888 |
| MPA | individual | -188.038 | 380.076 | 6.330 | 0.042 | 0.041 | 1.000 | 1.474 |  | 0.187 |  | 0.100 | 0.429 |
| ROT | collective | -138.129 | 286.259 | 0.000 | 1.000 | 1.000 | 0.310 | 0.000 | 0.000 | 0.315 | 0.483 | 0.149 | 0.016 |
| ROT | individual | -153.355 | 310.710 | 24.451 | 0.000 | 0.000 | 1.000 | 0.000 |  | 0.354 |  | 0.201 | 0.002 |
| SAU | collective | -108.185 | 226.370 | 0.000 | 1.000 | 0.987 | 0.309 | 0.000 | 9.998 | 0.262 | 0.164 | 0.061 | 0.954 |
| SAU | individual | -115.503 | 235.005 | 8.635 | 0.013 | 0.013 | 1.000 | 1.489 |  | 0.271 |  | 0.129 | 0.208 |
| SOM | collective | -70.536 | 151.072 | 0.000 | 1.000 | 0.958 | 0.002 | 10.000 | 10.000 | 1.500 | 0.149 | 0.107 | 0.528 |
| SOM | individual | -76.671 | 157.343 | 6.271 | 0.043 | 0.042 | 1.000 | 0.000 |  | 0.377 |  | 0.161 | 0.080 |
| SRA | collective | -123.371 | 256.742 | 0.000 | 1.000 | 1.000 | 0.247 | 0.096 | 0.208 | 0.213 | 0.492 | 0.052 | 0.979 |
| SRA | individual | -138.114 | 280.228 | 23.486 | 0.000 | 0.000 | 1.000 | 3.002 |  | 0.213 |  | 0.143 | 0.081 |
| STU | collective | -155.700 | 321.400 | 4.319 | 0.115 | 0.103 | 0.352 | 0.000 | 1.028 | 0.521 | 0.156 | 0.045 | 1.000 |
| STU | individual | -156.540 | 317.081 | 0.000 | 1.000 | 0.897 | 1.000 | 1.347 |  | 0.161 |  | 0.055 | 0.995 |
| SWP | collective | -40.424 | 90.848 | 0.000 | 1.000 | 0.953 | 0.000 | 0.129 | 1.275 | 0.365 | 0.384 | 0.100 | 0.722 |
| SWP | individual | -46.441 | 96.882 | 6.034 | 0.049 | 0.047 | 1.000 | 0.000 |  | 0.424 |  | 0.144 | 0.277 |
| YAL | collective | -256.218 | 522.436 | 0.000 | 1.000 | 1.000 | 0.153 | 0.994 | 0.253 | 0.189 | 0.287 | 0.065 | 0.715 |
| YAL | individual | -274.067 | 552.135 | 29.699 | 0.000 | 0.000 | 1.000 | 0.590 |  | 0.213 |  | 0.095 | 0.236 |
| ZSL | collective | -150.273 | 310.546 | 0.000 | 1.000 | 1.000 | 0.052 | 0.000 | 10.000 | 0.374 | 0.200 | 0.048 | 0.710 |
| ZSL | individual | -181.734 | 367.468 | 56.921 | 0.000 | 0.000 | 1.000 | 0.965 |  | 0.424 |  | 0.122 | 0.003 |