**Supplementary material**

**Table S1**

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| ***Univariate exploratory analyses of the influence of reproductive allocation in the previous breeding season on reproductive effort and success in the current breeding season*** | | |
|  |  |  |
| Random term: Group identity  Dispersion parameter = residual deviance / degrees of freedom  Reproductive effort = number of breeding attempts, defined as distinct clutches laid and incubated  Reproductive success = number of young that survived to nutritional independence at 90 days of age | | |
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| --- | --- | --- | --- | --- | --- | --- |
| **Model** | **N** | **Est** | **SE** | **z-value** | **95% CI** | **Dispersion parameter** |
| Number of days invested in breeding during the previous breeding season | | | | | | |
| * On current reproductive effort | 131 | -0.039 | 0.051 | -0.765 | -0.139, 0.060 | 1.051 |
| * On current reproductive success | 110 | 0.051 | 0.084 | 0.601 | -0.119, 0.212 | 1.468 |
| Number of breeding attempts during the previous breeding season | | | | | | |
| * On current reproductive effort | 133 | -0.051 | 0.029 | -1.780 | -0.108, 0.004 | 0.983 |
| * On current reproductive success | 113 | -0.067 | 0.044 | -1.532 | -0.156, 0.017 | 1.429 |
| Number of surviving young produced during the previous breeding season | | | | | | |
| * On current reproductive effort | 114 | 0.050 | 0.053 | 0.935 | -0.057, 0.154 | 1.018 |
| * On current reproductive success | 99 | 0.010 | 0.056 | 1.788 | -0.014, 0.204 | 1.516 |

None of the previous reproductive allocation parameters were considered to explain significant patterns within our data as all models tested had confidence intervals that crossed zero and p-values > 0.05. Two previous reproductive allocation parameters were significant at alpha < 0.1, with confidence intervals that narrowly crossed zero; the influence of the number of breeding attempts during the previous breeding season on the number of breeding attempts during the current breeding season (−; *p* = 0.075) and the influence of the number of young produced during previous breeding season on the number of young produced during the current breeding season (+; *p* = 0.074). We investigated these further but visual inspection of the data (Fig. S1) suggested weak patterns, particularly for the analyses on number of surviving young. Inclusion of these parameters in the models resulted in a ~30% reduction in sample size due to missing data for reproductive allocation in previous years for a) the entire first season of data, b) all new groups for the first breeding season that they were included in the dataset, and c) all groups which were excluded from the dataset for one or more breeding seasons due to changes in the dominant pair within a breeding season. Reducing the sample size by 30% reduces the power to detect the two-way interactions between weather and group size that we set out to test, from Cohen’s *f2* = 0.19 to *f2* = 0.30 in analyses of reproductive effort and from *f2* = 0.29 to *f2* = 0.44 in analyses of reproductive success. Additionally, when we included these parameters in full model sets, we reached the same conclusion as for models with these parameters excluded (Table S2 and Table S3) – i.e. that rainfall (which we have measured as drought vs. no drought) is the most important driver of reproductive effort and success in our study system.

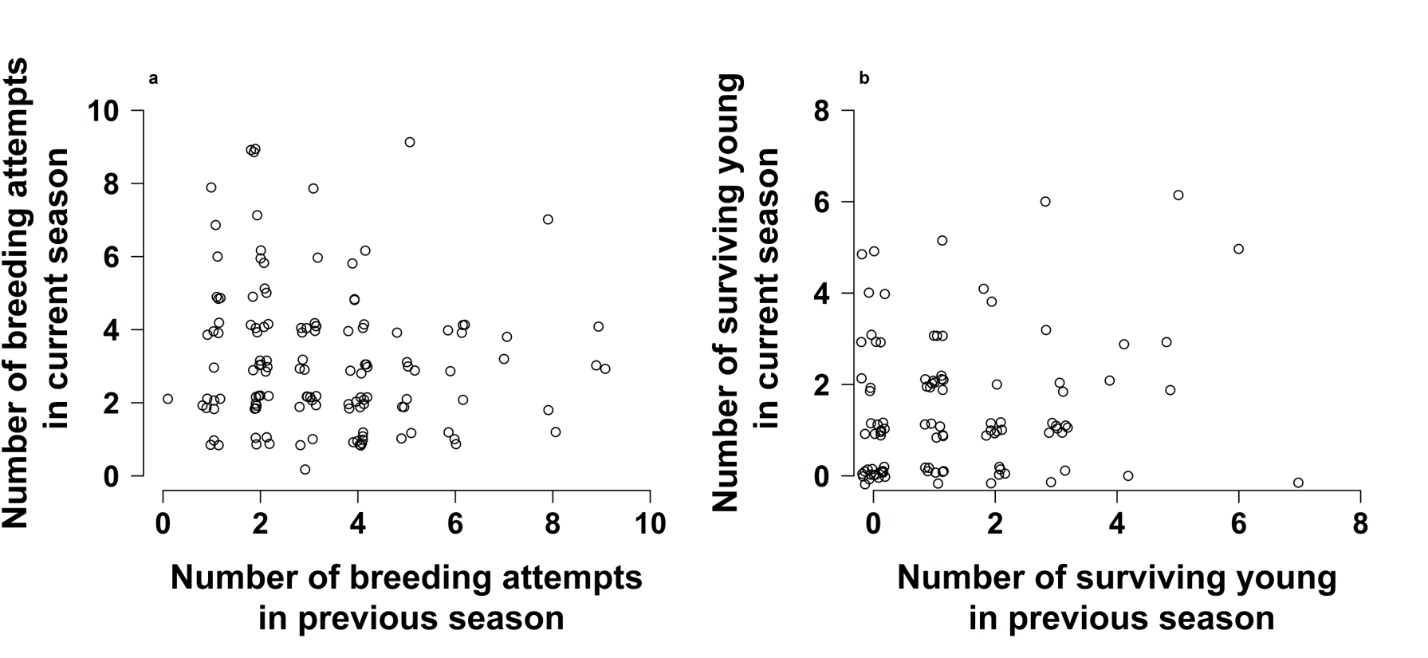


Figure S1: (a) Number of breeding attempts initiated per group per breeding season in relation to the number of breeding attempts initiated per group in the previous breeding season, and (b) number of surviving young per group per breeding season in relation to the number of surviving young per group in the previous breeding season. Data points are integers and have been jittered for improved visibility.

**Table S2**

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| ***Factors affecting the number of breeding attempts undertaken by***  ***each social group, including previous reproductive allocation*** | | | |
|  |  |  |  |
| Data from 113 group-seasons from 26 groups over 14 breeding seasons | | | |
| Random term: Group identity  Top models and all models within 5 ∆AICc of the top model shown in bold and highlighted in grey | | | |
|  |  |  |  |
| **Model Term** | **AICc** | | **∆AICc** | ***ωί*** |
| Null model | 445.9 | | 40.6 | 0.000 |
| Average group size | 447.5 | | 42.06 | 0.000 |
| DroughtSeason(t-1) | 432.8 | | 27.34 | 0.000 |
| DroughtSeason(t) | 415.8 | | 10.34 | 0.006 |
| Mean TmaxSeason(t-1) | 427.0 | | 21.54 | 0.000 |
| Mean TmaxSeason(t) | 446.6 | | 41.14 | 0.000 |
| Number of days invested in breeding Season(t-1) | 447.9 | | 42.49 | 0.000 |
| Number of breeding attempts Season(t-1) | 446.9 | | 41.49 | 0.000 |
| Number of surviving young produced Season(t-1) | 447.2 | | 41.79 | 0.000 |
| **DroughtSeason(t) + DroughtSeason(t-1)** | **405.4** | | **0.00** | **0.993** |
| Average group size+ Mean TmaxSeason(t-1) + Average group size \* Mean TmaxSeason(t-1) | 430.1 | | 24.65 | 0.000 |
| Average group size+ Mean TmaxSeason(t) + Average group size \* Mean TmaxSeason(t) | 446.1 | | 40.65 | 0.000 |
| Average group size + DroughtSeason(t-1) + Average group size\* DroughtSeason(t-1) | 434.9 | | 29.47 | 0.000 |
| Average group size + DroughtSeason(t) + Average group size \* DroughtSeason(t) | 419.8 | | 14.40 | 0.001 |
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**Table S3**

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| ***Factors affecting the number of surviving young produced by***  ***each social group, including previous reproductive allocation*** | | | |
|  |  |  |  |
| Data from 98 group-seasons from 25 groups over 13 breeding seasons | | | |
| Random term: Group identity | | | |
| Top models and all models within 5 ∆AICc of the top model shown in bold and highlighted in grey |  |  |  |
| **Model Term** | **AICc** | **∆AICc** | | ***ωί*** |
| Null model | 328.1 | 18.91 | | 0.000 |
| Average group size | 323.2 | 14.00 | | 0.000 |
| DroughtSeason(t-1) | 321.5 | 12.22 | | 0.001 |
| DroughtSeason(t) | 321.9 | 12.67 | | 0.001 |
| Mean TmaxSeason(t-1) | 330.1 | 20.83 | | 0.000 |
| **Mean TmaxSeason(t)** | **310.1** | **0.89** | | **0.207** |
| Number of days invested in breeding Season(t-1) | 328.7 | 19.46 | | 0.000 |
| Number of breeding attempts Season(t-1) | 328.7 | 19.44 | | 0.000 |
| Number of surviving young produced Season(t-1) | 327.0 | 7.73 | | 0.000 |
| **Average group size+ DroughtSeason(t-1)** | **313.5** | **4.24** | | **0.039** |
| Average group size+ DroughtSeason(t) | 317.5 | 8.26 | | 0.005 |
| **Average group size+ Mean TmaxSeason(t-1)** | **309.2** | **0.00** | | **0.323** |
| DroughtSeason(t) + DroughtSeason(t-1) | 316.4 | 7.15 | | 0.009 |
| **Average group size+ DroughtSeason(t) + DroughtSeason(t-1)** | **309.6** | **0.32** | | **0.275** |
| **Average group size+ Mean TmaxSeason(t-1) +Average group size \* Mean TmaxSeason(t-1)** | **311.2** | **2.00** | | **0.119** |
| Average group size+ Mean TmaxSeason(t) + Average group size \* Mean TmaxSeason(t) | 326.6 | 17.37 | | 0.000 |
| Average group size + DroughtSeason(t-1) + Average group size\* DroughtSeason(t-1) | 315.0 | 5.72 | | 0.019 |
| Average group size + DroughtSeason(t) + Average group size \* DroughtSeason(t) | 319.4 | 10.14 | | 0.002 |
|  |  |  |  |

In order to be certain that the patterns we observed were indeed driven by weather factors rather than prior reproductive allocation, we further subset the data into sections representing two consecutive non-drought years. We conducted post-hoc tests for subsets of the data from the period 2009/2010 – 2010/2011 and 2010/2011 – 2011/2012 because we had paired data available for at least 10 breeding groups for each these consecutive non-drought breeding seasons. We considered whether reproductive allocation (measured as number of breeding attempts initiated and number of surviving young produced) during a non-drought breeding season was influenced by breeding effort or success in the previous (also non-drought) breeding season, using non-parametric paired Mann-Whitney-Wilcoxon Signed-Rank Tests, and found no evidence for a relationship between prior and current reproductive effort or success (Table S4).

**Table S4**

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| --- | --- | --- | --- |
|  | **N** | **Mann-Whitney-Wilcoxon Signed-Rank Test (*V*)** | **p-value** |
| Number of breeding attempts initiated | | | |
| 2009/2010 – 2010/2011 | 13 | 51 | 0.361 |
| 2010/2011 – 2011/2012 | 14 | 13 | 0.079 |
| Number of surviving young produced | | | |
| 2009/2010 – 2010/2011 | 10 | 30 | 0.836 |
| 2010/2011 – 2011/2012 | 14 | 29 | 0.454 |

**Table S5**

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| ***Factors affecting the number of breeding attempts undertaken by***  ***each social group*** | | |
|  |  |  |
| Data from 190 group-seasons from 39 groups over 15 breeding seasons | | |
| Random term: Group identity |  |  |

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| **Model Term** | **AICc** | **∆AICc** | ***ωί*** |
| Null model | 744.6 | 68.95 | 0.000 |
| Average group size | 746.4 | 70.73 | 0.000 |
| DroughtSeason(t-1) | 724.8 | 49.22 | 0.000 |
| DroughtSeason(t) | 692.3 | 16.68 | 0.000 |
| Mean TmaxSeason(t-1) | 718.0 | 42.36 | 0.000 |
| Mean TmaxSeason(t) | 743.1 | 67.52 | 0.000 |
| RainfallSeason(t-1) | 741.2 | 65.57 | 0.000 |
| RainfallSeason(t) | 696.3 | 20.64 | 0.000 |
| DroughtSeason(t) + DroughtSeason(t-1) | 675.6 | 0.00 | 0.999 |
| Mean TmaxSeason(t) + Mean TmaxSeason(t-1) | 713.0 | 37.42 | 0.000 |
| Average group size+ Mean TmaxSeason(t-1) + Average group size \* Mean TmaxSeason(t-1) | 721.3 | 45.67 | 0.000 |
| Average group size+ Mean TmaxSeason(t) + Average group size \* Mean TmaxSeason(t) | 741.3 | 65.68 | 0.000 |
| Average group size + DroughtSeason(t-1) + Average group size\* DroughtSeason(t-1) | 726.6 | 50.95 | 0.000 |
| Average group size + DroughtSeason(t) + Average group size \* DroughtSeason(t) | 695.9 | 20.32 | 0.000 |
| DroughtSeason(t-1) + Mean TmaxSeason(t-1) + DroughtSeason(t-1) \* Mean TmaxSeason(t-1) | 709.4 | 33.74 | 0.000 |
| DroughtSeason(t) + Mean TmaxSeason(t-1) + DroughtSeason(t) \* Mean TmaxSeason(t-1) | 691.7 | 16.12 | 0.001 |
| DroughtSeason(t-1) + Mean TmaxSeason(t) + DroughtSeason(t-1) \* Mean TmaxSeason(t) | 727.2 | 51.58 | 0.000 |
| DroughtSeason(t) + Mean TmaxSeason(t) + DroughtSeason(t) \* Mean TmaxSeason(t) | 694.8 | 19.17 | 0.000 |

**Table S6**

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| ***Factors affecting the number of surviving young (90 days) produced***  ***by each social group*** | | |
|  |  |  |
| Data from 156 group-season from 32 groups over 15 breeding seasons | | |
| Random term: Group identity |  |  |

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| --- | --- | --- | --- |
| **Model Term** | **AICc** | **∆AICc** | ***ωί*** |
| Null model | 535.9 | 28.90 | 0.000 |
| Average group size | 532.7 | 25.73 | 0.000 |
| DroughtSeason(t-1) | 528.8 | 21.76 | 0.000 |
| DroughtSeason(t) | 520.8 | 13.81 | 0.000 |
| Mean TmaxSeason(t-1) | 519.0 | 11.99 | 0.001 |
| Mean TmaxSeason(t) | 537.7 | 30.74 | 0.000 |
| Average group size+ DroughtSeason(t-1) | 521.6 | 14.55 | 0.000 |
| Average group size+ DroughtSeason(t) | 516.9 | 9.90 | 0.003 |
| Average group size+ Mean TmaxSeason(t-1) | 516.3 | 9.32 | 0.004 |
| DroughtSeason(t) + DroughtSeason(t-1) | 515.2 | 8.20 | 0.008 |
| DroughtSeason(t-1) + Mean TmaxSeason(t-1) | 518.3 | 11.25 | 0.002 |
| DroughtSeason(t) + Mean TmaxSeason(t-1) | 514.9 | 7.84 | 0.009 |
| Average group size+ DroughtSeason(t-1) + DroughtSeason(t) | 507.3 | 0.30 | 0.399 |
| Average group size+ DroughtSeason(t-1) + Mean TmaxSeason(t-1) | 513.5 | 6.48 | 0.018 |
| Average group size+ DroughtSeason(t) + Mean TmaxSeason(t-1) | 511.8 | 4.76 | 0.043 |
| DroughtSeason(t-1) + DroughtSeason(t) + Mean TmaxSeason(t-1) | 513.0 | 6.04 | 0.023 |
| Average group size + DroughtSeason(t) + DroughtSeason(t) + Mean TmaxSeason(t-1) | 507.0 | 0.00 | 0.463 |
| Average group size+ Mean TmaxSeason(t-1) + Average group size \* Mean TmaxSeason(t-1) | 516.8 | 9.83 | 0.003 |
| Average group size+ Mean TmaxSeason(t) + Average group size \* Mean TmaxSeason(t) | 536.1 | 29.08 | 0.000 |
| Average group size + DroughtSeason(t-1) + Average group size\* DroughtSeason(t-1) | 523.2 | 16.20 | 0.000 |
| Average group size + DroughtSeason(t) + Average group size \* DroughtSeason(t) | 518.9 | 11.87 | 0.001 |
| DroughtSeason(t-1) + Mean TmaxSeason(t-1) + DroughtSeason(t-1) \* Mean TmaxSeason(t-1) | 514.0 | 7.03 | 0.014 |
| DroughtSeason(t) + Mean TmaxSeason(t-1) + DroughtSeason(t) \* Mean TmaxSeason(t-1) | 515.4 | 8.43 | 0.007 |
| DroughtSeason(t-1) + Mean TmaxSeason(t) + DroughtSeason(t-1) \* Mean TmaxSeason(t) | 530.3 | 23.27 | 0.000 |
| DroughtSeason(t) + Mean TmaxSeason(t) + DroughtSeason(t) \* Mean TmaxSeason(t) | 521.1 | 14.11 | 0.000 |