Appendix 1. Top supported models (ΔAIC = 0) or competitive non-nested models (ΔAIC < 2) of daily survival rate (DSR) for adult female mallards throughout the breeding season. Standard errors of regression coefficients are provided in square brackets, and random effects, if supported, are presented with the intercept term (± ε). These models were used to create figures of daily mortality rates (1 – DSR) throughout the manuscript. Figures of significant relationships not illustrated in the manuscript are also presented. **Date** is Julian date – 90 (i.e. 1 = 1 Apr). **Layer**, **Incubator**, **Postnester**, and **Brood** are dummy variables (1 if bird is in category, 0 if not). **DaysSinceMarking**, **EggsLaid**, **IncStage**, **RenestInterval**, and **BroodAge** represent days since entering each of the 5 reproductive categories. ∑**Eggs** and ∑**Inc** are numbers of eggs laid or days incubated in prior nesting attempts, respectively. **FAge** is female age (2, 1, or 1·6 if unknown), **XMT** is a dummy variable denoting an external transmitter, **Mass** is standardized body mass from decoy trapping, and **Mass2** is standardized body mass for females first captured during late incubation.

Combined reproductive periods (Fig. 2):

logit(DSR) = 9·13[0·54] – 0·104[0·033] * **Date** + 0·00095[0·000365] * **Date**^{2} – 0·782[1·565] * **Layer** – 3·211[0·966] * **Incubator** – 1·143[1·567] * **Postnester** + 0·0753[0·0058] * **Brood** – 0·0627[0·0236] * **DaysSinceMarking** + 0·000863[0·000395] * **DaysSinceMarking**^{2} + 0·134 [0·209] * **EggsLaid** – 0·0103[0·0180] * **EggsLaid**^{2} – 0·127[0·035] * **IncStage** + 0·00524[0·00146] * **IncStage**^{2} – 0·0729[0·0331] * **RenestInterval** + 0·00181[0·00105] * **RenestInterval**^{2} – 0·0613[0·1257] * **BroodAge** + 0·00534[0·00475] * **BroodAge**^{2} – 0·0942[0·0800] * **FAge** – 0·433[0·136] * **XMT** + 0·0106[0·0384] * **Mass** – 0·0179[0·0601] * **Date** * **Layer** + 0·000140 [0·000570] * **Date**^{2} * **Layer** + 0·0828[0·0408] * **Date** * **Incubator** – 0·000720[0·000403] * **Date**^{2} * **Incubator** + 0·00981[0·0576] * **Date** * **Postnester** + 0·000086[0·000514] * **Date**^{2} * **Postnester** + 0·0700[0·1263] * **Date** * **Brood** – 0·000800 [0·000720] * **Date**^{2} * **Brood**

Prenesting period (Fig. 3):

logit(DSR) = 9·60[0·574] – 0·1207[0·0335] * **Date** + 0·00112[0·00037] * **Date**^{2} – 0·0565[0·0237] * **DaysSinceMarking** + 0·000757[0·000395] * **DaysSinceMarking**^{2} – 0·491[0·196] * **XMT** – 0·206[0·119] * **FAge**

Laying period (graphed below):

logit(DSR) = 5·49[0·15] – 0·117[0·052] * ∑**Eggs** + 0·00605[0·00325] * ∑**Eggs**^{2} + 0·0683[0·0397] * ∑**Inc**; -2 log Likelihood = 1067·16, AIC = 1075·16

logit(DSR) = 7·27[1·28] – 0·0767[0·0465] * **Date** + 0·000710[0·000403] * **Date**^{2}; -2 log Likelihood = 1070·48, AIC = 1076·48 (graph is nearly identical to Fig. 2).

Incubation period (Fig. 4):

logit(DSR) = 6·12[0·84] ± 0·152[0·087] * **Site(ε)** – 0·0289[0·0249] * **Date** + 0·000244[0·000179] * **Date**^{2} – 0·129[0·036] * **IncStage** + 0·00541[0·00147] * **IncStage2** + 0·0251[0·0152] * ∑**Eggs**

Postnesting period (Fig. 3):

logit(DSR) = 6·36[1·37] ± 0·258[0·140] * **Site(ε)** – 0·0428[0·0437] * **Date** + 0·000647[0·000331] * **Date**^{2} – 0·0780[0·0332] * **RenestInterval** + 0·00191[0·00105] * **RenestInterval**^{2} – 0·832[0·370] * **XMT**

Brood-rearing period (graphed below):

logit(DSR) = 6·69[0·44] + 0·0774[0·0401] * **BroodAge** + 1·405[0·369] * **Mass2**

Fig. A1.1 Model-based estimates of daily mortality (with 85% prediction intervals) for female mallards during the laying period in relation to previous investment in reproduction (top; solid lines = eggs laid in previous nests, dashed lines = days incubated in previous nests).

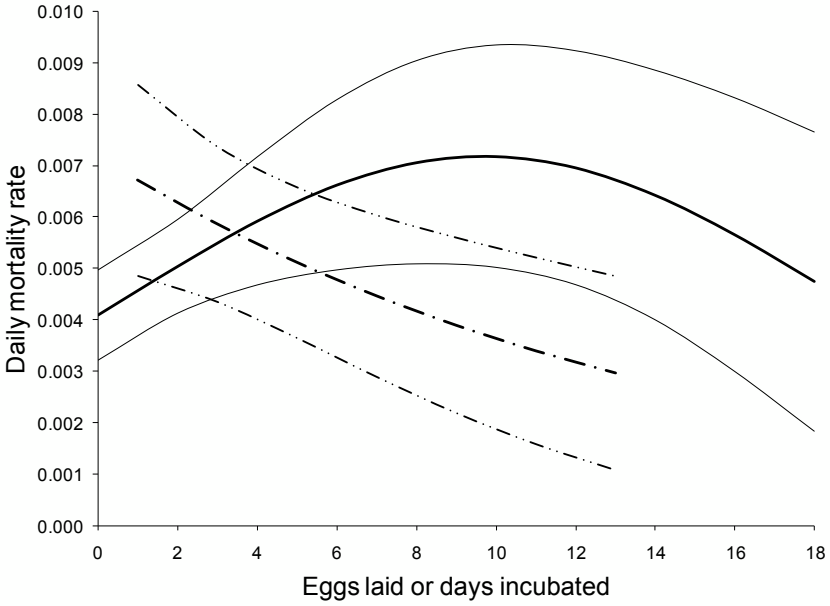


Fig. A1.2. Model-based estimates of daily mortality rate (with 85% prediction intervals) during the brood-rearing period in relation to brood age (top) and body mass during late incubation (bottom).

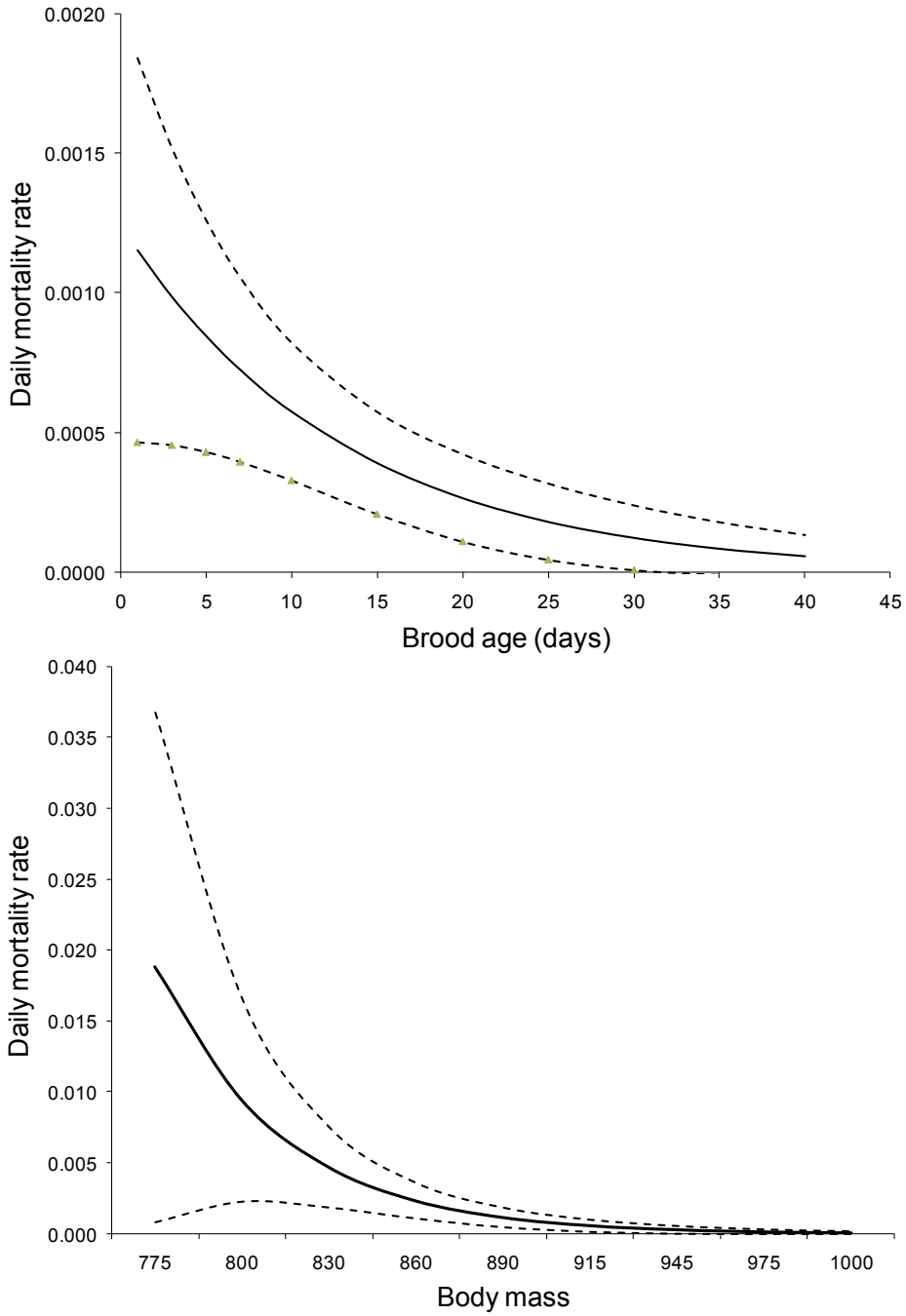
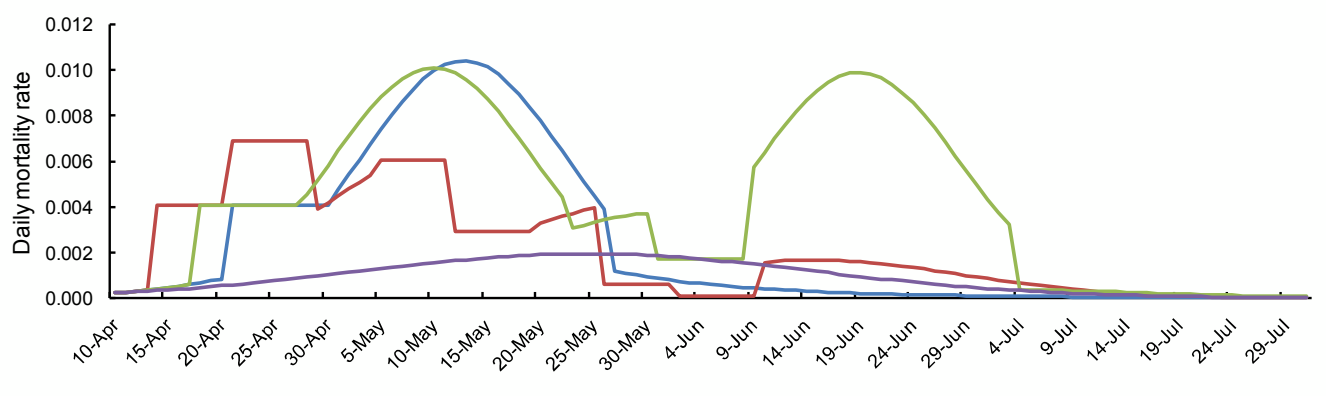
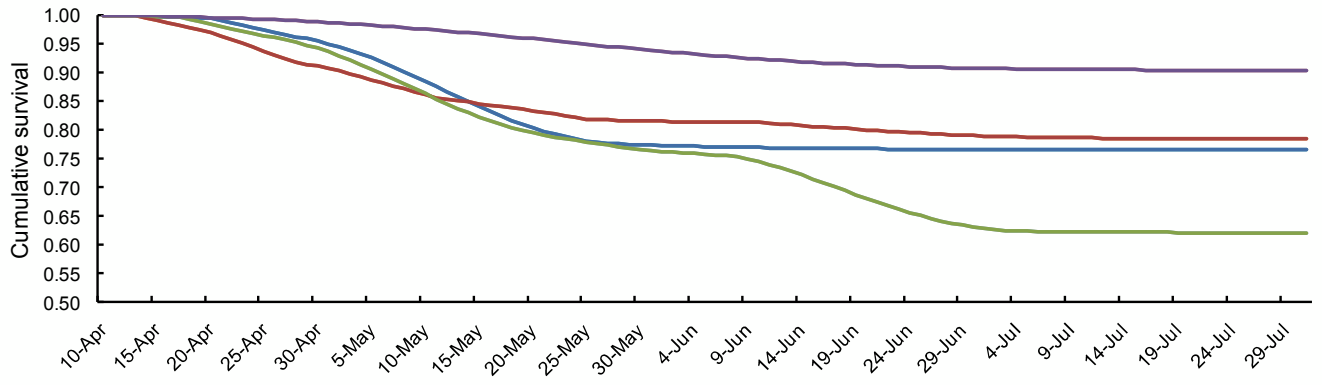


Fig. A1.3. Daily mortality rate (DMR; top pane) and cumulative survival (bottom pane) of four hypothetical female mallards. Mallard 1 (blue line) represents a successful nester: she is marked on 10 April, nests 12 days later (sharp increase in DMR), lays 10 eggs (flat plateau at 0.004 DMR), incubates for 26 days (large hump), hatches a brood (sharp decline) and raises it to fledging age (slow decline in DMR). Mallard 2 (red line) represents a persistent but unsuccessful renester and illustrates the impacts of high cumulative egg production (45 total eggs laid): she begins nesting 5 days after arrival on 10 April, and initiates 6 nests (flat plateaus), all of which fail during the laying stage. After nests 1, 3, and 5 fail at the 7-egg stage, she initiates continuation nests and lays 8 more eggs without delay in nests 2, 4, 6, after which she engages in 6-day renesting intervals before resuming again. Although DMR during laying increases after the first clutch of 7 eggs, it declines thereafter, which is inconsistent with the cost of reproduction hypothesis. Despite laying substantially more eggs (45) than Mallards 1 (10) and 3 (19), she has higher cumulative survival because she never incubates. Mallard 3 (green line) represents a bird that engages maximally in incubation: she nests twice and incubates for 25 days before clutch failure (i.e., 50 total days spent incubating). Mortality risk does not go up from cumulative investment, but because she spends 50 total days incubating she has the lowest cumulative mortality of all 4 females. Finally, Mallard 4 (purple line) never initiates a nest and her mortality profile reflects only date effects; she has the highest cumulative survival.




Cumulative survival
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
0.60
0.55
0.50
10-Apr
15-Apr
20-Apr
25-Apr
30-Apr
5-May
10-May
15-May
20-May
25-May
30-May
4-Jun
9-Jun
14-Jun
19-Jun
24-Jun
29-Jun
4-Jul
9-Jul
14-Jul
19-Jul
24-Jul
29-Jul