

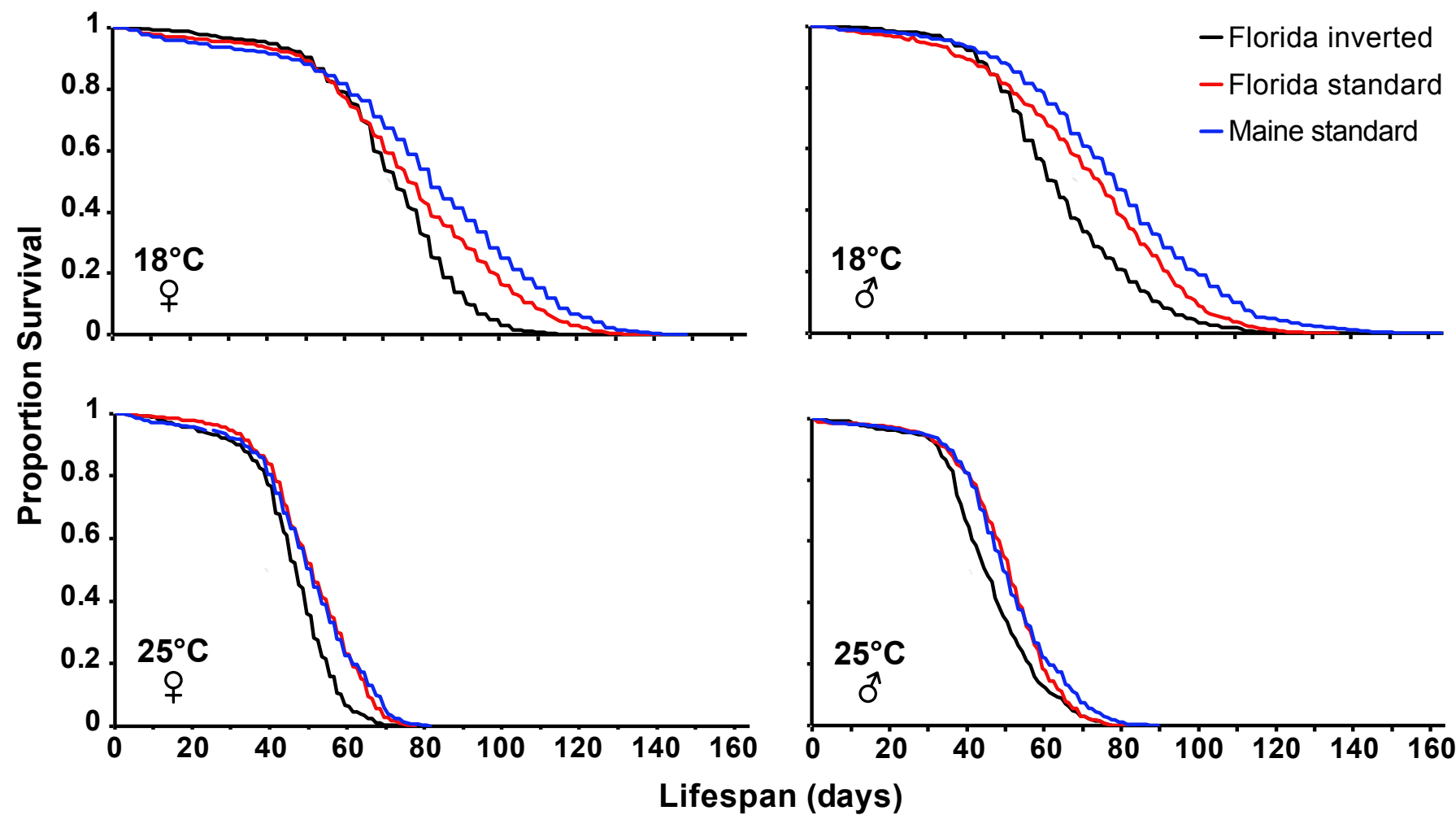
Supporting Information

Supporting Figure Legends

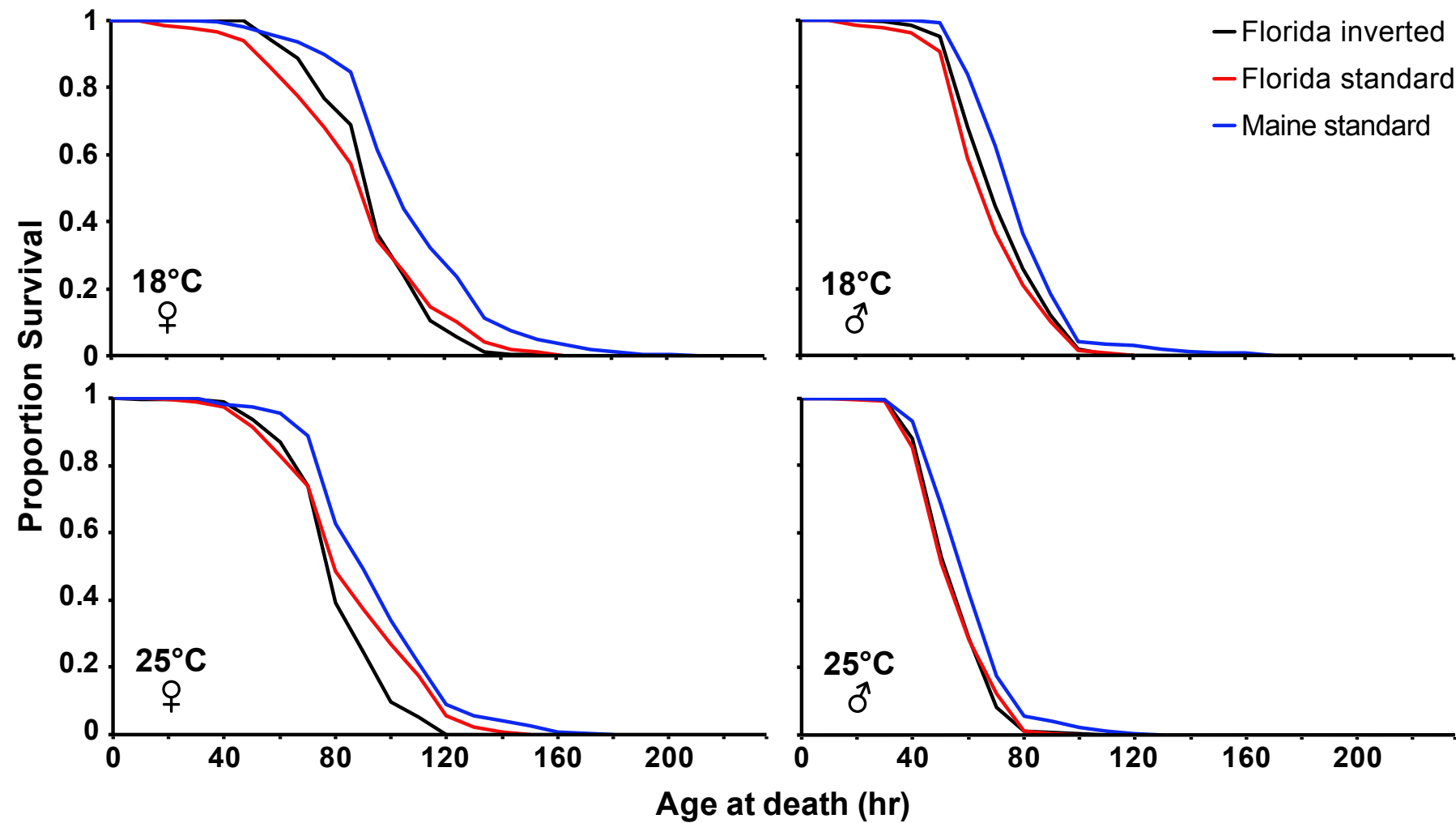
Figure S1. Survival curves as a function of *In(3R)P* karyotype and temperature. Effects of *In(3R)P* and temperature (18°C vs. 25°C) on the proportion adult survival in females and males. The different curves represent Florida inverted (black), Florida standard (red), and Maine standard (blue). See Results, Fig. 1, and Table 1 for details.

Figure S2. Starvation survival curves as a function of *In(3R)P* and temperature. Effects of *In(3R)P* and temperature (18°C vs. 25°C) on the proportion adult survival upon starvation in females and males. The different curves show Florida inverted (black), Florida standard (red), Maine standard (blue). See Results, Fig. 2 and Table 2 for details.

14 **Figure S1**



16 **Figure S2**



A preliminary analysis of trait relationships

In previous work (Kapun *et al.*, 2016b) we had shown that *In(3R)P* affects various proxies of body size; since body size and lifespan covary positively with increasing latitude along the North American east coast (e.g., Coyne & Beecham, 1987; Schmidt & Paaby, 2008), and given that some non-clinal studies have found a positive relation between size and lifespan as well (e.g., McCulloch & Gems, 2003 and Khazaeli *et al.*, 2005; and references therein), the question arises whether the effects of *In(3R)P* on lifespan might be explained by its effects on size.

To begin to address this question we used data on female wing area (mm²), a proxy of body size, collected during our experiment using the methods described in Kapun *et al.* (2016b) (sample sizes: FI, 18°C: 265, FI, 25°C: 273; FS, 18°C: 275, FS, 25°C: 272; MS, 18°C: 270, MS, 25°C: 280; data at Dryad: doi:10.5061/dryad.3vb89dj). Analysis of these data qualitatively confirmed that *In(3R)P* karyotype affects wing area, with inversion homokaryons from Florida having smaller wings than standard homokaryons from both Florida and Maine (mixed-effects ANOVA, karyotype: $F_{2,23.99} = 24.57$, $P < 0.0001$ [Tukey's HSD posthoc test: FI < FS < MS, all $P < 0.05$]; temperature: $F_{1,1605} = 5151.68$, $P < 0.0001$; temperature \times karyotype: $F_{2,1605} = 5151.68$, $P < 0.0001$; variance component estimate of the random effect of line[karyotype] not shown).

Since – for practical reasons – we could not measure wing area on the same individuals as those used in the lifespan assay, we were unable to estimate the covariance between size and lifespan using bivariate data collected from the same animals; we thus had to analyze the relationship between these traits using line means. Because a fully factorial analysis of covariance (ANCOVA) on this relatively small number of line means was likely to be underpowered, we fit an ANOVA model to the residuals from a linear regression of lifespan against wing area. The effect of karyotype was not significant (karyotype: $F_{2,48} = 2.6$, $P =$

0.0845; temperature: $F_{1,48} = 2.6$, $P = 0.035$; temperature \times karyotype: $F_{2,48} = 0.098$, $P < 0.90$), suggesting that covariation between size and lifespan might explain part of the variation in lifespan among karyotypes (albeit probably not all, given the marginally non-significant P -value). We tentatively conclude that the effects on the assayed survival traits are affected, but not driven exclusively, by the effects of karyotype on size. However, our analysis here is crude and preliminary: a more refined and powerful analysis (i.e., ANCOVA) will require measuring both size and age at death on the same individuals.

In support of the notion that *In(3R)P* represents a life-history supergene affecting multiple, partly intercorrelated life-history traits, multivariate analysis of variance (MANOVA) showed that karyotype has a significant effect on multivariate phenotype (i.e., on a linear combination of size, lifespan, starvation and cold survival) (karyotype: Wilk's $\lambda = 0.33$, approx. $F_{8,90} = 8.44$, $P < 0.0001$ [contrast inverted vs. standard, $P < 0.05$]; temperature: $F_{4,45} = 110.9$, $P < 0.0001$; temperature \times karyotype: Wilk's $\lambda = 0.84$, approx. $F_{8,90} = 0.99$, $P = 0.45$).

Supporting References

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