Supplementary Material

Appendix S1. Detailed demographic structure of initial experimental populations. The sex ratio of the yearling and juvenile lizards was hold constant (1:1). In all populations six yearling females and six yearling males were released. All yearling and all adult male lizards were released together (Yearlings: June 7th, Adult males: July 11th), and the newborn juveniles and their mother were released two days after hatching. The sex of the juveniles was determined by counting the number of the ventral scales (Lecomte *et al.* 1992) and the juvenile sex ratio was kept as constant as possible. MB consisted of 21.3 ± 0.5 SD juvenile males and 21.8 ± 0.7 SD juvenile females and FB populations consisted of 21.0 ± 0.6 SD juvenile males and 22.3 ± 1.1 SD juvenile females. There were no statistical differences in juvenile sex ratio between MB and FB populations ($F_{1,10} = 0.03$, $P = 0.86$). At release, the sex ratio of the population including all age classes was biased towards males in MB (SR = 0.56 ± 0.004 SE) and it was biased towards females in FB (SR = 0.42 ± 0.004 SE) populations ($N = 12$, $F_{1,10} = 568.04$, $P < 0.001$). Lizards were able to disperse using a 20 m long dispersal corridor, which ended in a pitfall trap (for details see Le Galliard *et al.* 2003a). Dispersing lizards were collected daily and introduced on the same day into a new, to them unknown population of the same sex ratio treatment. By this procedure we prevented the evening out of the sex ratio bias due to potential sex ratio biased dispersal. Age structure, juvenile and yearling sex ratios, and population density were similar between treatments and correspond to the natural structure in populations from which the lizards originated (Massot *et al.* 1992).

Appendix S2. Demographic structure of experimental populations during the second year of the study.

We released all alive females ($N = 148$) and their offspring ($N = 551$) together with other lizards from all age and sex classes into new populations with a female-biased sex ratio. The female-biased sex ratio was chosen to mimic the long-term mean sex ratio experienced by female lizards in the wild. We released these other lizards together with the experimental groups to guarantee similar population structures among enclosures and years. Within each enclosure, the offspring sex ratio was held constant (1:1) and the proportion of offspring originating from male-biased and female-biased populations was similar (Cote et al. 2007; Le Galliard et al. 2007). In brief, populations were initiated with 10 adult males, 18 adult females, 12 yearlings (6 males and 6 females), and 103.3 ± 3.08 SE juveniles. These patterns corresponded to the age and sex structure and to the density of natural populations from which the introduced individuals originated (Massot *et al.* 1992).

Appendix S3. Long-term study of growth patterns. In June 1999 we captured pregnant female lizards in three neighbouring populations located in the Cévennes mountainous range, Southern France (44°30’ N, 3°45’ E, 1420 m a.s.l.). The females (*N* = 147) were brought to the Research Station at Foljuif (Seine-et-Marne, France, 48°17’N, 2°41’E) and kept in individual cages until they gave birth. Females were maintained under standardized conditions (water, temperature, light) as described previously (Le Galliard *et al.* 2003b). Three days following hatching, offspring (*N* = 846) were released into 11 outdoor enclosures (10 x 10m and located in the same meadow as all other enclosures used for the here presented experiments) where they were monitored until May 2003. These enclosures were similar to those used in the main study and they were also extended with dispersal corridors (see Le Galliard *et al.* (2003a) for a description of outdoor facilities). The population density in those enclosures ranged from 20 adults and sub-adults in a low-density group (5 enclosures) to 40 adults and sub-adults in a high-density group (6 enclosures). Each May-June following release, lizards were recaptured and their body size (snout-vent length, SVL) was measured to study body growth trajectories. This allowed us to assess growth trajectories for 42 lizards until the age of three to four years. Since population density did not influence the long-term growth trajectories, we pooled data from the low-density and high-density groups and present the results of this analysis in figure 1.

Appendix S4. Statistical analysis of growth trajectories. We modelled body growth using the non-linear van Bertalanffy growth model. This model has three parameters and writes like $SVL = SVL_{max} + (SVL_0-SVL_{max})*exp(-exp(logk)*age)$, where SVL_{max} is the asymptotic body size, SVL_0 is the body size at hatching and logk is the logarithm of the exponential growth rate. The van Bertalanffy growth model was fitted with the *nlme* procedure in R 2.4.0 (Pinheiro & Bates 2002). The initial model included sex effects and random individual variation on the three parameters. The best fitting model was chosen by backward elimination of non-significant terms following (Pinheiro & Bates 2002).

Appendix S5. Statistical analysis of the intensity of sexual selection. We investigated whether the standardized decomposed fitness components were correlated using simple regressions. We estimated the importance of each multiplicative fitness component for total fitness using a multivariate regression with the standardized number of one-year old offspring as dependent variable and the standardized decomposed fitness components as covariates (Conner *et al.* 1996). Since the assumptions were not fulfilled for all simple regressions and for some of the multiple regressions, we transformed the variables to get meaningful significance tests. However, untransformed relative fitness was used for the estimation of the selection gradients to preserve the evolutionary interpretation of the gradients and to make the selection gradients comparable between populations (Conner *et al.* 1996). Presented are the means and standard errors of the standardized selection gradients per sex-ratio treatment (results section, Figure 2). To understand whether the standardized selection gradients were significantly different between sex-ratio treatments we applied one-way ANOVAs. In the case that the normality or homoscedasticity assumption was not fulfilled we applied a Wilcoxonsigned ranks test. In figure 2 we present means and standard errors of the standardized selection gradients per sex-ratio treatment if there were significant differences between sex-ratio treatments, otherwise we present means and standard errors calculated over all populations. The significant selection gradient between body size and mean juvenile survival was positive in 1-33% of the populations. Since the selection gradients of the remaining populations were negative, the selection gradient averaged over all experimental populations was negative. The difference in the direction between the significant and the averaged selection gradient is indicated by (+). In all other cases the direction of the significant selection gradients was the same as for the selection gradient averaged over all populations.

Appendix S6. Statistical analysis of survival selection acting on male body size and body condition.

We analysed survival selection acting on male SVL between release (July 2002) and recapture (May 2003). We used survival as dependent variable in a generalized linear mixed model (GLIMMIX procedure) and added ASR treatment and age class as fixed factors, population nested in ASR treatment as a random factor, and SVL as a covariate. There was no survival selection acting on male body size (Table 1) . All interactions were non-significant (*P* > 0.3).

Table 1: Survival selection acting on male SVL.

Parameter	**df**	**test statistic**	**P**
SVL	1,423	*F* = 1.46	0.227
Age class	2,423	*F* = 0.18	0.839
ASR treatment	1,10	*F* = 0.11	0.744
Population (ASR treatment)		*z* = 1.68	0.047

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