

**Table S1. Micronutrient content ( $\mu\text{g/g}$ ) in different types of seeds commonly present in commercial seed mixtures for tropical birds.** Only the values of those micronutrients for which there were published data are shown.

	Pearl millet	Red millet	Common millet	Yellow millet	Canary seed
Vitamin A	0.2	0.1	0	1.9	-
Vitamin E	64.8	21.6	18.9	31	31.6
Vitamin B1	3.1	2.4	7.3	4.8	8.5
Vitamin B2	2.9	1.1	3.8	1.2	1.6
Vitamin C	20.0	10	35	25	-

Sources: Abdel-Aal et al., 2011; Blount et al., 2003; Li and Beta, 2012; Nambiar et al., 2011; Royle et al., 2003; Ruskin, 1999; Shahidi, 1997; Simwemba et al., 1984 and The USDA Nutrient Database for Standard Reference (SR27)

**Table S2. Mean, standard deviation (SD) and range of variation ( $\mu\text{g/day}$ ) of micronutrients intake in normal aviary conditions, and the experimental treatments for an adult-size bird and assuming a daily intake of 3g of seeds.** For aviary conditions, values are based in the estimated micronutrient content of 4 different seed mix [common millet-yellow millet-canary seed (3:1:1); pearl-common millet (1:1); yellow-common millet (1:1) and pearl-yellow (1:1)].

	Aviary condition ( $\mu\text{g/day}$ )			Experimental treatments	
	Mean	SD	range	Low	High
Vitamin A	1.85	1.37	0.3-3.15	0.09	1.22
Vitamin E	103.92	36.23	71.6-143.7	60.8	81.06
Vitamin B1	16.67	3.92	11.8-21.1	14.6	16.47
Vitamin B2	8.05	1.64	6.1-10.1	7.4	11.15
Vitamin C	79.5	9.40	67.5-90	67.5	90.02

**Table S3. Micronutrient composition of ‘Magic Antistress Mix’/’Performax’ (Feed-Food Ltd, UK).**

<b>Fat-soluble vitamins</b>	Concentration (units)
Vitamin A	2,000.000 (IU/kg)
Vitamin D3	10 (mg/kg)
Vitamin E	2 (g/kg)
Vitamin K	1 (g/kg)
<b>Water-soluble vitamins</b>	
Vitamin B1	1 (g/kg)
Vitamin B2	2 (g/kg)
Vitamin B5	6 (g/kg)
Vitamin B6	2.3 (g/kg)
Vitamin B12	11 (mg/kg)
Vitamin C	12 (g/kg)
<b>Amino acids</b>	
DL-methionine	7.5 (g/kg)
L-Lysine	15 (g/kg)
Betaine	2.5 (g/kg)
L-Carnitine	2.5(g/kg)

The Mix also contained trace amounts of MgSO<sub>4</sub>, MnSO<sub>4</sub>, ZnSO<sub>4</sub>, NaHCO<sub>3</sub>, KCl, NaCl, Se, citric acid, formic acid, propionic acid, sorbic acid.

**Table S4. Estimated daily consumption ( $\mu\text{g}$  every third day; see text) of different diet micronutrients by zebra finches fed with a low, standard or high micronutrient diet during different age periods.** The low and high diets were the ones used in the experimental manipulations; the standard one is the commercial diet recommended for cage finches (Johnson & Jeff Ltd, UK) that all birds received before and after the experiment. All calculations assume that birds consumed the different types of seeds present in the seed mix (see text) in direct proportion to the degree to which they were available, and a daily consumption of seeds of 0.74 g on days 1 to 5. 1.83 g on days 6 to 10. 2.7g on days 10 to 15 and 3 g from day 16 onward.

Age	0-5 days			6-10 days			11-15 days			16 days onward		
	Low	Standard	High	Low	Standard	High	Low	Standard	High	Low	Standard	High
Vitamin A	0.02	0.30	0.77	0.05	0.70	2.09	0.08	1.00	3.13	0.09	1.10	3.48
Vitamin E	15.00	17.70	30.00	37.10	46.70	74.20	54.70	64.40	109.40	60.80	71.60	121.60
Vitamin B1	3.60	5.20	4.99	8.90	12.90	12.33	13.10	19.00	18.15	14.60	21.10	20.23
Vitamin B2	1.80	2.10	4.54	4.50	5.20	11.35	6.60	7.70	16.64	7.40	8.50	18.66
Vitamin C	16.70	19.20	33.41	41.20	47.60	82.43	60.80	70.20	121.65	67.50	78.00	135.06

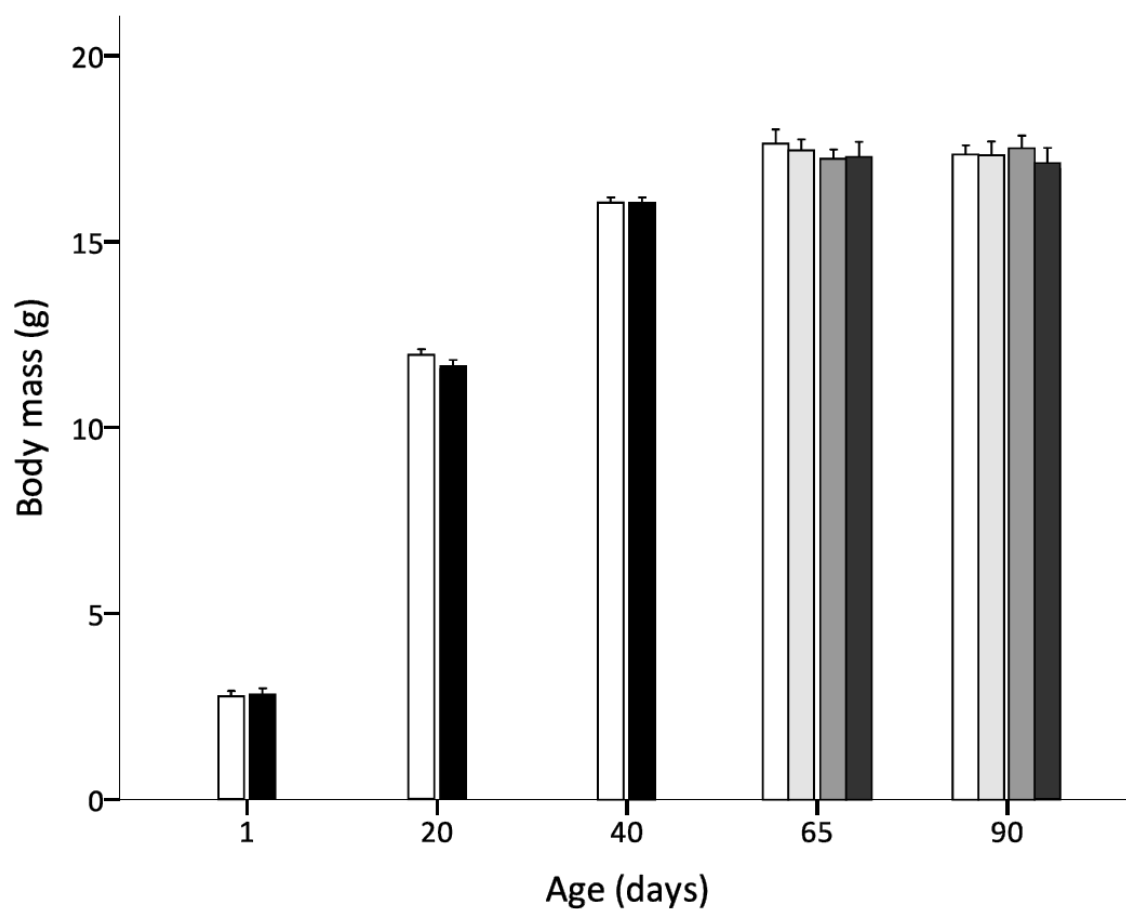
**Table S5. Summary of mixed models (LMM and GLMM) for the effects of micronutrient treatments and covariates on body mass growth, pectoral muscle and body fat stores.** ‘T-growth’ and ‘T-maturation’ refer to the dietary treatments during the growth period and the period of sexual maturation, respectively. Variables retained in the final models are shown in bold. For removed terms, significance levels are those estimated when terms were dropped from the model.

Source of variation	Body mass			Pectoral muscle			Fat stores		
	F or Wald Z	df <sub>n,d</sub>	P	F or Wald Z	df <sub>n,d</sub>	P	F or Wald Z	df <sub>n,d</sub>	P
Age	<b>3223.167</b>	<b>4,462.97</b>	<b>&lt;0.001</b>	0.685	3,464	0.562	<b>60.934</b>	<b>3,394.60</b>	<b>&lt;0.001</b>
Sex	<b>5.893</b>	<b>1,116.90</b>	<b>0.017</b>	0.121	1,463	0.729	<b>6.496</b>	<b>1,119.26</b>	<b>0.012</b>
Body mass	-	-	-	<b>7.538</b>	<b>1,471</b>	<b>0.006</b>	<b>55.823</b>	<b>1,434.68</b>	<b>&lt;0.001</b>
T-growth	0.619	1,115.09	0.433	0.090	1,462	0.764	0.614	1,115.53	0.435
T-maturation	1.113	1,115.94	0.294	0.668	1,467	0.414	0.281	1,114.51	0.597
T-growth x T-maturation	0.077	1,111.80	0.782	0.100	1,460	0.752	0.588	1,112.13	0.445
T-grow x age	0.757	4,458.95	0.786	0.115	3,456	0.952	1.158	3,342.96	0.326
T-maturation x age	0.432	4,455.00	0.786	0.332	1,461	0.565	1.911	3,345.90	0.128
Sex x age	<b>12.145</b>	<b>4,462.97</b>	<b>&lt;0.001</b>	0.108	3,453	0.955	0.663	3,347.43	0.575
Sex x T-growth	0.704	1,112.76	0.403	0.005	1,459	0.944	0.008	1,111.99	0.928
Sex x T-maturation	2.535	1,113.74	0.114	0.022	3,450	0.996	3.529	1,114.35	0.630
Sex x T-growth x T-maturation	0.609	1,110.90	0.437	0.011	1,449	0.916	0.341	1,110.48	0.560
Sex x age x T-growth	2.210	4,450.98	0.067	0.036	3,440	0.991	1.020	3,333.74	0.384
Sex x age x T-maturation	1.027	4,447.03	0.393	0.057	3,443	0.982	0.768	3,330.67	0.513
T-growth x T-maturation x age	0.801	4,442.95	0.525	0.063	3,446	0.979	1.562	3,336.96	0.199
Sex x age x T-growth-T-maturation	1.727	4,391.01	0.143	0.104	3,437	0.958	1.672	3,328.16	0.173
<i>Random factors</i>									
Individual	<b>5.289</b>	-	<b>&lt;0.001</b>	<b>0<sup>a</sup></b>	-	<b>1</b>	<b>4.216</b>	-	<b>&lt;0.001</b>

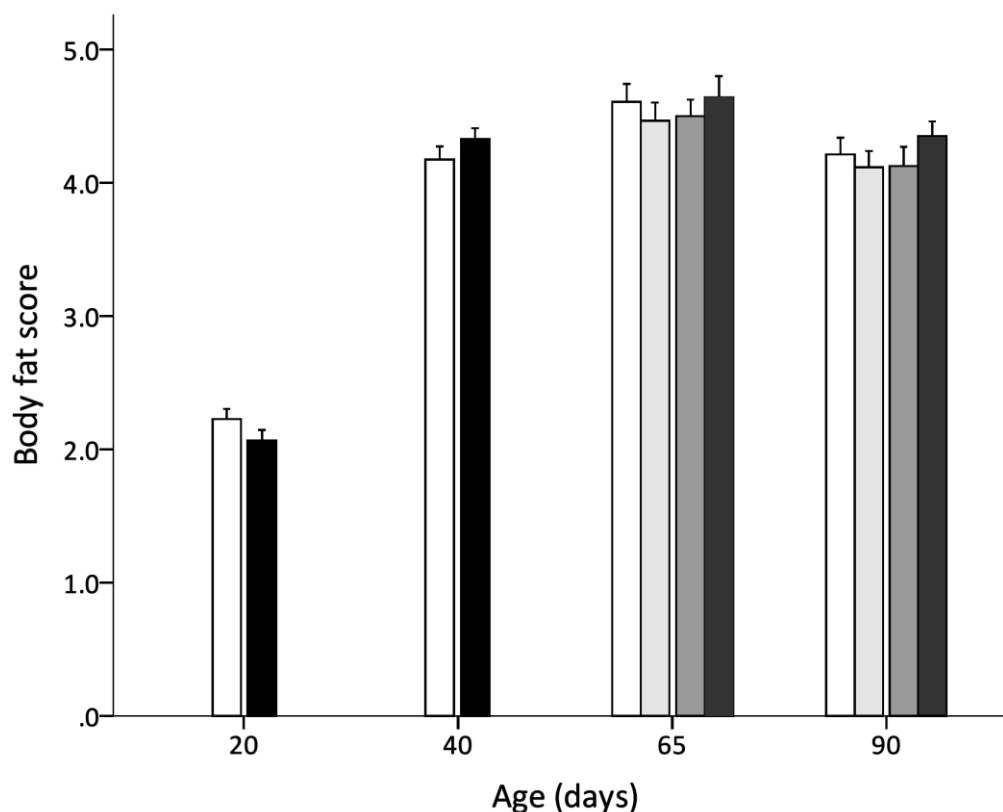
<sup>a</sup>Parameter estimate bound to zero, therefore no Z and SE are estimated.

**Table S6. Pearson's correlation coefficients among oxidative stress measures.** Significant correlations are shown in bold.

	20 days			40 days			90 days		
	TAC	GPx	MDA	TAC	GPx	MDA	TAC	GPx	MDA
TAC	-			-			-		
GPx	r=0.041 p=0.657	-		r=0.084 p=0.365	-		r=0.143 p=0.132	-	
MDA	r=0.155 p=0.093	r=-0.58 p=0.528	-	<b>r=0.283</b> <b>p=0.002</b>	r=-0.133 p=0.154	-	r=0.165 p=0.084	<b>r=-0.216</b> <b>p=0.020</b>	-



**Fig. S1. Body mass (mean + SE) during the growth period (0-40 days) and the period of sexual maturation (40-90 days).** Birds on the Low micronutrient diet are represented by white bars and those on the High diet by black bars. Birds that were switched at 40 days from the Low to the High diet are represented by light grey bars while those switched in the opposite direction (from High to Low) are shown as dark grey bars.



**Fig. S2. Body fat scores (mean + SE) during the growth period (0-40 days) and the period of sexual maturation (40-90 days).** Birds on the Low micronutrient diet are represented by white bars and those on the High diet by black bars. Birds that were switched at 40 days from the low to the high diet are represented by light grey bars while those switched in the opposite direction (from High to Low) are shown as dark grey bars.