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Appendix 1

Construction of reference curve and calculation of confidence limits

As the data on self-selected lipid:protein (L:P) ratio following the pre-treatments were heteroscedatic and could not be transformed to meet the parametric assumptions, they were tested with a proportional hazards test. This revealed that the self-selected L:P ratios depended on pre-treatment L:P ('diet' but was independent of sex (Wald test, diet $\chi^2_4 = 79.63$, $p < 0.0001$; sex $\chi^2_1 = 0.002$, $p = 0.96$; diet × sex $\chi^2_4 = 8.72$, $p = 0.068$). Therefore, sexes were merged to form a single curve. We used the mean L:P ratios from each pre-treatment diet group to model the relationship between the self-selected L:P ratio and the pre-treatment L:P ratio.

A general relationship between the pre-treatment L:P ratio (LP_{pt}) and the subsequently self-selected L:P ratio (LP_{ss}) can be written as

$$(L{:}P_{ss})^{Z_1} = a + b \times \left(L{:}P_{pt}\right)^{Z_2} \quad \text{(A1)}$$

where a and b are constants; Z_1 and Z_2 are exponents that linearize the relationship. Backwards indication of the L:P ratio experienced in the field ($L{:}P_{field}$) is obtained by inserting the value of L:P1 in Equ. 1 instead of LP_{ss} and solving for $LP_{pt} = L{:}P_{field}$:

$$\left(L{:}P_{field}\right)^{Z_2} = \frac{(L{:}P_{ss})^{Z_1} - a}{b} \quad \text{(A2)}$$

We found a very close fit between LP_{ss} and LP_{pt} by reciprocal transformation: $1/L{:}P_{ss} = 1.123 + 4.015 * L{:}P_{pt}$ ($R^2_{Adj.} = 0.99$, $F_{1,3} = 356.0$, $p = 0.0003$) (Fig. 3). Therefore, $Z_1 = -1$ and $Z_2 = 1$.

The 95% confidence limits around the estimate was calculated from the formula in Hald (1960, p. 551):

$$\left(L{:}P_{field}\right)^{Z_2} \pm t_{97.5}\ \frac{s}{b}\ \sqrt{\frac{1}{n_s} + \frac{1}{n_r} + \frac{\left[\left(L{:}P_{field}\right)^{Z_2} - \bar{x}\right]^2}{SSD_x}} \quad \text{(A3)}$$

where t has n_r-2 degrees of freedom; s is the root mean square error around the regression line of the reference curve; n_s is the sample size of the field data; n_r is the sample size of the reference curve (= 5); $\bar{x}$ and SSDx are the mean and the sum of squares of deviation of the transformed LP_{pt} ratios in the reference data. We consider the $L{:}P_{field}$ estimates significantly different from the estimated intake target if the target lies outside the confidence limits.

References

Hald, A. 1960. Statistical theory with engineering applications. – Wiley.

Appendix 2

Table A1. The double-test procedure: Repeated-measures MANOVA of total consumption and lipid:protein (L:P) ratios of the consumed food by *A. dorsalis*, comparing results for the first and the second self-selection test ('Time'). Significant p-values in bold.

	df	F	p
Total consumption			
All data			
Time	1,101	85.82	**<0.0001**
Time×field	4,101	5.23	**0.0007**
Time×sex	1,101	15.35	**0.0002**
Time×field×sex	4,101	1.32	0.2691
Females			
Time	1,51	64.98	**<0.0001**
Time×field	4,51	3.92	**0.0075**
Males			
Time	1,50	23.32	**<0.0001**
Time×field	4,50	1.69	0.1671
L:P ratio			
All data			
Time	1,101	13.11	**0.0005**
Time×field	4,101	1.02	0.4014
Time×sex	1,101	2.35	0.1282
Time×field×sex	4,101	1.35	0.2561