– Supplementary Information –

Ensuring access to high-quality resources reduces the impacts of heat stress on bees

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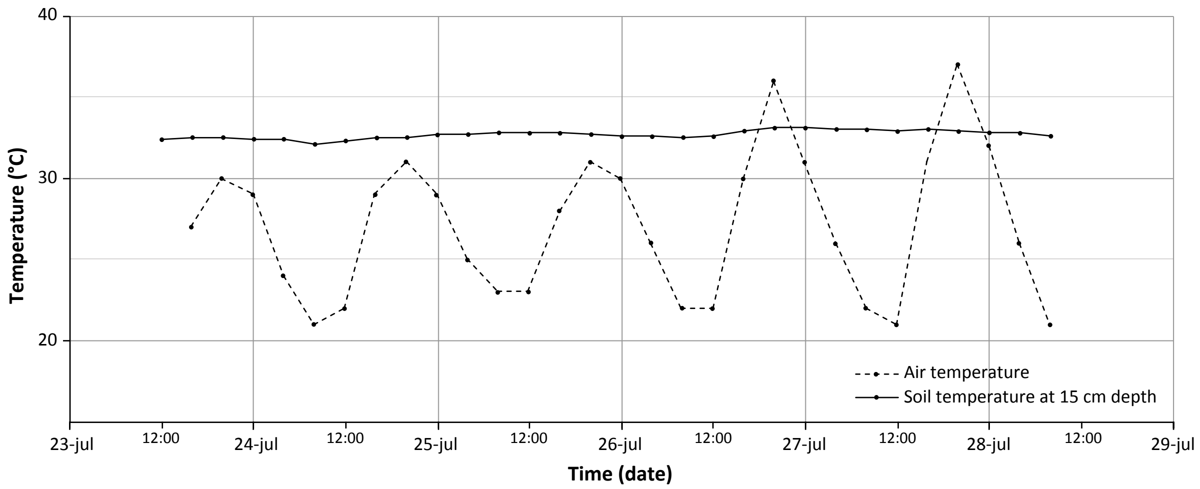

Figure S1. Outdoor air temperature and soil temperature at 15 cm depth in Belgium (Kalmthout) during a heat wave (July 2018). Soil temperature was measured using a data logger, air temperature was retrieved on www.timeanddate.com on January 2018.

Table S1. Performance of bumblebee colonies. Global effects of nutritional stress and heat stress as well as two-way interactions. Results of one-way analysis of variance (ANOVA) models and post-hoc tests are presented.

		Colony growth (g) Model: Gamma Link: inverse	**Mortality (%)** Model: gaussian (large); binomial (small) Link: identity (large); logit (small)
Large colony	Nutritional stress	$F_{2,18}$= 68.21 p< 0.001	$F_{2,18}$= 9.75 p = 0.0014
	Heat stress	$F_{2,18}$= 0.64 p= 0.5408	$F_{2,18}$= 3.03 p= 0.0734
	Nutritional stress : Heat stress	$F_{4,18}$= 1.63 p = 0.2105	$F_{4,18}$= 6.33 p= 0.0023
		Post-hoc tests	
	Control group – *Salix*-dominant diet	b	a
	Control group – *Cistus*-dominant diet	b	a
	Control group – *Taraxacum*-dominant diet	a	ab
	Short stress group – *Salix*-dominant diet	b	a
	Short stress group – *Cistus*-dominant diet	b	ab
	Short stress group – *Taraxacum*-dominant diet	a	c
	Long stress group – *Salix*-dominant diet	b	a
	Long stress group – *Cistus*-dominant diet	b	bc
	Long stress group – *Taraxacum*-dominant diet	a	ab
Small colony	Nutritional stress	$F_{2,81}$= 31.54 p< 0.001	χ^2= 6.19, df = 2 p= 0.0452
	Heat stress	$F_{2,81}$= 27.62 p< 0.001	χ^2 = 2.11, df = 2 p= 0.3478
	Nutritional stress : Heat stress	$F_{4,81}$= 19.89 p< 0.001	χ^2 = 11.10, df = 4 p= 0.0254
		Post-hoc tests	
	Control group – *Salix*-dominant diet	e	a
	Control group – *Cistus*-dominant diet	de	a
	Control group – *Taraxacum*-dominant diet	cd	a
	Short stress group – *Salix*-dominant diet	de	a
	Short stress group – *Cistus*-dominant diet	de	a
	Short stress group – *Taraxacum*-dominant diet	bc	a
	Long stress group – *Salix*-dominant diet	ce	a
	Long stress group – *Cistus*-dominant diet	b	a
	Long stress group – *Taraxacum*-dominant diet	a	a

Table S2. Resource collection of bumblebee colonies. Global effects of nutritional stress and heat stress as well as two-way interactions. Results of one-way analysis of variance (ANOVA) models and post-hoc tests are presented.

		Pollen collection (g) Model: gaussian Link: identity	Syrup collection (g) Model: gaussian Link: identity
Large colony	Nutritional stress	$F_{2,18}= 67.21$ $p< 0.001$	$F_{2,18}= 87.67$ $p< 0.001$
	Heat stress	$F_{2,18}= 1.93$ $p= 0.1746$	$F_{2,18}= 1.88$ $p= 0.1808$
	Nutritional stress : Heat stress	$F_{4,18}= 1.90$ $p = 0.1540$	$F_{4,18}= 5.69$ $p= 0.0039$
		Post-hoc tests	
	Control group – *Salix*-dominant diet	b	ce
	Control group – *Cistus*-dominant diet	b	cd
	Control group – *Taraxacum*-dominant diet	b	ab
	Short stress group – *Salix*-dominant diet	b	e
	Short stress group – *Cistus*-dominant diet	b	ce
	Short stress group – *Taraxacum*-dominant diet	a	a
	Long stress group – *Salix*-dominant diet	b	de
	Long stress group – *Cistus*-dominant diet	b	bc
	Long stress group – *Taraxacum*-dominant diet	a	a
Small colony	Nutritional stress	$F_{2,81}= 68.26$ $p< 0.001$	$F_{2,81}= 25.75$ $p< 0.001$
	Heat stress	$F_{2,81}= 38.67$ $p< 0.001$	$F_{2,81}= 101.5307$ $p< 0.001$
	Nutritional stress : Heat stress	$F_{4,81}= 0.85$ $p = 0.4968$	$F_{4,81}= 7.44$ $p< 0.001$
		Post-hoc tests	
	Control group – *Salix*-dominant diet	d	c
	Control group – *Cistus*-dominant diet	d	c
	Control group – *Taraxacum*-dominant diet	bc	c
	Short stress group – *Salix*-dominant diet	cd	b
	Short stress group – *Cistus*-dominant diet	c	b
	Short stress group – *Taraxacum*-dominant diet	ab	b
	Long stress group – *Salix*-dominant diet	bc	b
	Long stress group – *Cistus*-dominant diet	c	b
	Long stress group – *Taraxacum*-dominant diet	a	b