

SUPPLEMENTARY INFORMATION

Exploring the role of host specialisation and oxidative stress in interspecific lifespan variation in subtropical tephritid flies

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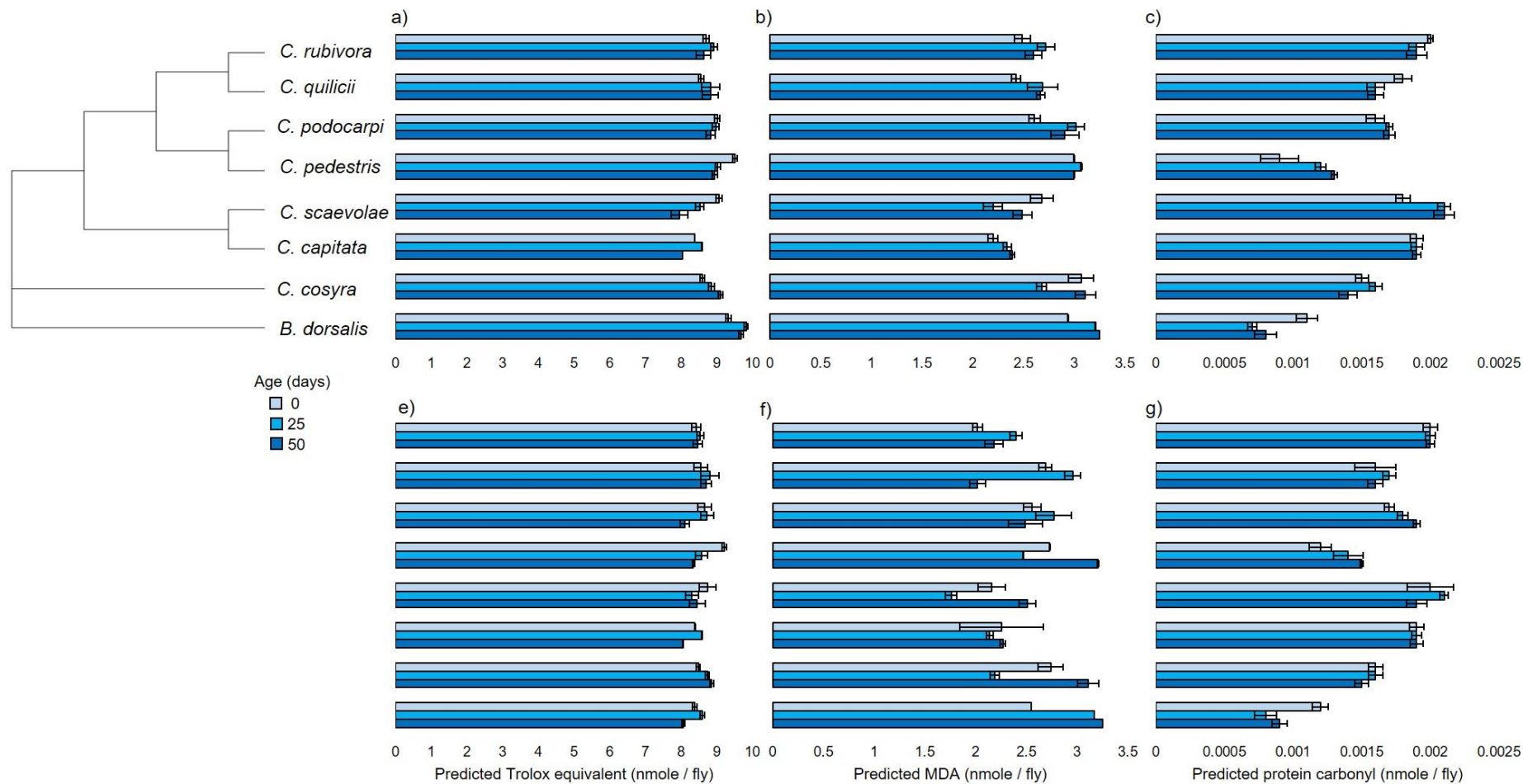


Figure S1. Oxidative damage and antioxidant protection of eight species of tephritid flies at three different ages and sorted by species relatedness. Total antioxidant capacity in females (a) and males (e). Lipid peroxidation in females (b) and males (f). Protein oxidation in females (c) and males (g). The values displayed are the means predicted by the model used for statistical analyses. Error bars indicate the standard error of the predicted mean.

Table S1. Post-hoc comparisons for total antioxidant capacity across species at specific ages (days).

Species 1	Species 2	Age	Estimate	z	p
		0	0,156	0,76	1
<i>Cosyra</i>	<i>Capitata</i>	25	0,228	1,13	1
		50	0,928	4,49	< 0.01
		0	0,925	4,47	< 0.01
<i>Dorsalis</i>	<i>Capitata</i>	25	1,168	5,65	< 0.001
		50	1,566	7,58	< 0.001
		0	0,973	4,71	< 0.001
<i>Pedestris</i>	<i>Capitata</i>	25	0,290	1,40	0,999
		50	0,638	3,08	0,241
		0	0,442	2,14	0,898
<i>Podocarpi</i>	<i>Capitata</i>	25	0,341	1,65	0,994
		50	0,524	2,53	0,648
		0	0,336	1,63	0,995
<i>Quilicii</i>	<i>Capitata</i>	25	0,194	0,94	1
		50	0,780	3,77	0,03
		0	0,193	0,93	1
<i>Rubivora</i>	<i>Capitata</i>	25	0,172	0,83	1
		50	0,565	2,74	0,487
		0	0,699	3,38	0,11
<i>Scaevolae</i>	<i>Capitata</i>	25	-0,196	-0,97	1
		50	0,227	1,10	1
		0	0,768	3,72	0,036
<i>Dorsalis</i>	<i>Cosyra</i>	25	0,940	4,65	<0.001
		50	0,637	3,08	0,244
<i>Pedestris</i>	<i>Cosyra</i>	0	0,816	3,95	0,016

		25	0,061	0,30	1
		50	-0,290	-1,40	0,999
<i>Podocarpi</i>	<i>Cosyra</i>	0	0,285	1,38	0,999
		25	0,112	0,55	1
		50	-0,405	-1,96	0,957
<i>Quilicii</i>	<i>Cosyra</i>	0	0,180	0,87	1
		25	-0,030	-0,17	1
		50	-0,148	-0,72	1
<i>Rubivora</i>	<i>Cosyra</i>	0	0,036	0,17	1
		25	-0,055	-0,28	1
		50	-0,363	-1,75	0,98
<i>Scaevolae</i>	<i>Cosyra</i>	0	0,543	2,63	0,574
		25	-0,425	-2,15	0,891
		50	-0,701	-3,39	0,107
<i>Pedestris</i>	<i>Dorsalis</i>	0	0,048	0,23	1
		25	-0,878	-4,25	< 0.01
		50	-0,927	-4,48	< 0.01
<i>Podocarpi</i>	<i>Dorsalis</i>	0	-0,482	-2,33	0,794
		25	-0,828	-4,01	0,013
		50	-1,042	-5,04	< 0.001
<i>Quilicii</i>	<i>Dorsalis</i>	0	-0,587	-2,84	0,406
		25	-0,974	-4,71	< 0.001
		50	-0,780	-3,80	0,028
<i>Rubivora</i>	<i>Dorsalis</i>	0	-0,732	-3,54	0,07
		25	-0,996	-4,82	< 0.001
		50	-1,000	-4,84	< 0.001
<i>Scaevolae</i>	<i>Dorsalis</i>	0	-0,225	-1,09	1

		25	-1,365	-6,76	< 0.001
		50	-1,339	-6,47	< 0.001
<i>Podocarpi</i>	<i>Pedestris</i>	0	-0,531	-2,57	0,623
		25	0,050	0,24	1
		50	-0,114	-0,55	1
<i>Quilicii</i>	<i>Pedestris</i>	0	-0,636	-3,08	0,247
		25	-0,095	-0,46	1
		50	0,142	0,69	1
<i>Rubivora</i>	<i>Pedestris</i>	0	-0,780	-3,77	0,03
		25	-0,117	-0,57	1
		50	-0,073	-0,35	1
<i>Scaevolae</i>	<i>Pedestris</i>	0	-0,273	-1,32	0,999
		25	-0,486	-2,41	0,743
		50	-0,411	-1,98	0,95
<i>Quilicii</i>	<i>Podocarpi</i>	0	-0,105	-0,51	1
		25	-0,145	-0,71	1
		50	0,256	1,24	0,999
<i>Rubivora</i>	<i>Podocarpi</i>	0	-0,249	-1,21	1
		25	-0,168	-0,81	1
		50	0,041	0,20	1
<i>Scaevolae</i>	<i>Podocarpi</i>	0	0,257	1,25	0,999
		25	-0,537	-2,66	0,546
		50	-0,296	-1,43	0,999
<i>Rubivora</i>	<i>Quilicii</i>	0	-0,144	-0,70	1
		25	-0,022	-0,11	1
		50	-0,215	-1,04	1
<i>Scaevolae</i>	<i>Quilicii</i>	0	0,363	1,75	0,988

	25	-0,391	-1,94	0,962
	50	-0,553	-2,67	0,535
	0	0,507	2,45	0,712
<i>Scaevolae</i>	25	-0,369	-1,83	0,98
<i>Rubivora</i>	50	-0,338	-1,64	0,995

Table S2. Locations of host fruits from which the experimental flies originated.

Fly species	Fruit		Location	
	Species	Family	Locality in South Africa	Coordinates
<i>Bactrocera dorsalis</i>	<i>Mangifera indica</i>	Anacardiaceae	Low's Creek, Mpumalanga	25°41'09.2"S 31°11'05.3"E
<i>Ceratitis capitata</i>	<i>Psidium guajava</i>	Myrtaceae	Stellenbosch, Western Cape	33°52'57.7"S 18°44'28.7"E
<i>Ceratitis quilicii</i>	<i>Harphephyllum caffrum</i>	Anacardiaceae	Pretoria, Gauteng	25°46'44"S 28°13'24"E
	<i>Syzigium jambos</i>	Myrtaceae	Pretoria, Gauteng	25°45'09.2"S 28°13'46.6"E
<i>Ceratitis cosyra</i>	<i>Sclerocarya birrea</i>	Anacardiaceae	Bultfontein, Gauteng	25°28'54"S 28°13'19"E
<i>Ceratitis rubivora</i>	<i>Rubus fruticosus</i>	Rubiaceae	Hilton, KwaZulu-Natal	29°31'36.3"S 30°15'27.4"E
			Howick, KwaZulu-Natal	29°31'39.9"S 30°15'13.3"E
			Boston Park, KwaZulu-Natal	29°41'24.4"S 30°03'53.3"E
<i>Ceratitis pedestris</i>	<i>Strychnos cocculoides</i>	Loganiaceae	Bela Bela, Limpopo	24°53'17"S 28°23'16"E
	<i>Strychnos pungens</i>	Loganiaceae	Bela Bela, Limpopo	24°51'55"S 28°23'31"E
<i>Ceratitis podocarpi</i>	<i>Afrocarpus falcatus</i>	Podocarpaceae	Groenkloof, Pretoria, Gauteng	25°46'20.2"S 28°13'17.8"E
			University of Pretoria, Pretoria, Gauteng	25°45'12.2"S 28°13'38.4"E
			Brooklyn, Pretoria, Gauteng	25°46'36.5"S 28°13'39.3"E
<i>Ceratitis scaevolae</i>	<i>Scaevola plumieri</i>	Goodeniaceae	Richards Bay, KwaZulu-Natal	29°27'21.0"S 31°16'57.6"E
			Tinley Manor, KwaZulu-Natal	29°27'21"S 31°16'57"E

Table S3. Number of hosts confirmed for each of the eight species, and group size for females and males assayed in the survival experiment. Host records were obtained from De Meyer *et al.* (2002) and an online identification key (fruitflykeys.africamuseum.be). Sample size does not include individuals used for biochemical assays. The censored flies are the individuals that escaped or did not die from natural death (e.g. stuck in the sugar that tends to become liquid with time). They were not removed from the data set but were instead counted as censored in the survival analysis.

Species	Number of host (families)	Sample size (F / M)	Flies censored (F / M)
<i>Bactrocera dorsalis</i>	305 (59)	37 / 43	4 / 1
<i>Ceratitis capitata</i>	194 (53)	50 / 35	-
<i>Ceratitis quilicii</i>	13 (5)	86 / 90	- / 4
<i>Ceratitis cosyra</i>	10 (7)	47 / 73	1 / 1
<i>Ceratitis rubivora</i>	9 (1)	42 / 36	-
<i>Ceratitis pedestris</i>	6 (1)	54 / 71	3 / 9
<i>Ceratitis podocarpi</i>	3 (1)	33 / 36	-
<i>Ceratitis scaevolae</i>	1 (1)	85 / 73	4 / 3

Table S4. Origin and identification number for each individual of each species used to build the phylogenetic tree.

Species	ID	Country of origin	Database
<i>Bactrocera dorsalis</i>	AGIMP023-13	India	Bold Systems
	GBDPT1331-15	Nigeria	Bold Systems
	GBMIN62907-17	Nigeria	Bold Systems
	GBMIN62909-17	Nigeria	Bold Systems
	GBMIN62911-17	Nigeria	Bold Systems
	GBMIN62912-17	Nigeria	Bold Systems
	GBMIN62914-17	Nigeria	Bold Systems
	<i>Ceratitis capitata</i>	GBDP6963-09	South Africa
GBDP6960-09		South Africa	GenBank
GBDP6956-09		South Africa	GenBank
GBDP6887-09		South Africa	GenBank
GBDP6886-09		South Africa	GenBank
GBDP1758-06		Kenya	GenBank

	GBDP17543-15	Kenya	GenBank
<i>Ceratitis quilicii</i>	KU688181	Tanzania	GenBank
	KU688187	South Africa	GenBank
	KU688192	Reunion Island	GenBank
	KU688197	Tanzania	GenBank
	KU688201	South Africa	GenBank
<i>Ceratitis cosyra</i>	GBDP2218-06	South Africa	GenBank
	GBDP2219-06	South Africa	GenBank
	GBDP10791-12	Mozambique	GenBank
	GBMIN32872-13	South Africa	GenBank
	JTB020-12	Mozambique	Bold Systems
	JTB277-12	Botswana	Bold Systems
	MVTBI225-08	Mozambique	Bold Systems
	MVTBI226-08	Mozambique	Bold Systems
	MVTBI227-08	Mozambique	Bold Systems
	GBDP10816-12	South Africa	GenBank
<i>Ceratitis rubivora</i>	GBMIN19472-13	Kenya	GenBank
	GBMIN19473-13	Kenya	GenBank
	GBMIN19474-13	Kenya	GenBank
	GBMIN19592-13	Kenya	GenBank

	GBMIN19593-13	Kenya	GenBank
	GBMIN32848-13	South Africa	GenBank
	JTB234-12	Tanzania	Bold Systems
	MVTBI078-08	South Africa	Bold Systems
	GBDP10805-12	Kenya	GenBank
	GBDP17558-15	Kenya	GenBank
	GBMIN32860-13	Benin	GenBank
<i>Ceratitis pedestris</i>	JTB021-12	Mozambique	Bold Systems
	JTB326-12	Mozambique	Bold Systems
	MVTBI061-08	Mozambique	Bold Systems
	MVTBI318-09	Mozambique	Bold Systems
	GBDP10806-12	South Africa	GenBank
	GBMIN19465-13	Kenya	GenBank
<i>Ceratitis podocarpi</i>	GBMIN19466-13	Kenya	GenBank
	GBMIN19584-13	Kenya	GenBank
	GBMIN19585-13	Kenya	GenBank
	GBMIN32859-13	Kenya	GenBank

The table only displays hosts that are associated with the given fruit fly species in South Africa and for which information on the fruit phenology could be found. The reference numbers indicate the source mentioning the association between the host and the fruit fly species. 1) Grové *et al.* (2016); 2) De Meyer *et al.* (2002); 3) Grové *et al.* (2017); 4) Theron *et al.* (2017); 5) Mwatawala *et al.* (2006); 6) Jose *et al.* (2013); 7) Personal observation.

References:

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