Table S1. Characteristics of natal male nests. Locations: VV = Verdant Vale; EM = Eastern Main Rd; CT = Cumuto Tamana Rd. Means to 1 d.p.; nest comb size recorded once during departure/observation dates; mean number of adults between departure/observation dates.

Site and Number					Nest Comb Size						Adults Present on Dispersal	
Year	ID	Location	Departure/ Observation Dates	Number of Observed Male Dispersals	Total Number of Cells	Number of Eggs	Number of Larvae	Number of Pupae	Number of Empty Cells	Number of Parasitised Cells	Mean Number of Adult ♀	Mean Number of Adult ♂
2014	14002	VV	20 Jun	1	160	13	0	1	146	0	6.0	1.0
2014	14003	VV	22–24 Jun	3	334	56	58	15	205	0	17.0	1.0
2014	14005	VV	25 Jun	1	104	32	36	14	22	0	10.0	0.0
2014	14006	VV	17–24 Jul	5	59	7	0	1	40	11	4.1	1.3
2014	14007	VV	29 Jun–03 Jul	2	79	20	32	12	15	0	7.6	0.8
2014	14008	VV	13–14 Jul	4	146	30	37	26	35	18	10.5	2.5
2014	14017	VV	27 Jul	1	163	10	0	0	151	2	8.0	1.0
2014	14020	VV	25 Jun–03 Jul	6	165	35	55	12	61	2	10.9	1.7
2014	14022	VV	24–28 Jul	2	171	38	34	10	88	1	6.8	0.3
2014	14031	VV	21 Jul	1	118	0	0	7	111	0	13.0	0.0
2014	14042	VV	25 Jun–03 Jul	10	165	4	1	6	154	0	5.9	2.8
2014	14049	EM	14–15 Jul	3	83	0	0	4	79	0	8.5	2.5
2014	14082	EM	02 Aug	2	152	11	2	18	121	0	7.0	2.0
2014	14096	EM	13–15 Jul	2	248	100	95	24	29	0	21.0	0.7
2014	14333	EM	18–20 Jul	5	70	6	0	2	62	0	5.0	1.3
2015	15000	VV	19–21 Jul	3	126	23	16	17	70	0	8.0	1.0
2015	15001	VV	22 July–07 Aug	4	180	0	1	30	149	0	5.3	9.3
2015	15003	VV	22–29 Jul	10	117	0	0	5	112	0	3.3	4.6
2015	15011	CT	20 Aug–07 Sept	28	335	59	148	49	79	0	8.8	5.9
2015	15012	CT	29 Aug–07 Sept	30	484	131	157	131	65	0	26.0	26.9
2015	15013	CT	23 July, 06–08 Sept	5	128	51	56	18	3	0	5.7	3.7
2015	15017	EM	01–03 Sept	4	309	0	6	44	259	0	14.0	6.0
2015	15018	EM	31 Aug–02 Sept	18	-	-	-	-	-	-	17.0	9.7
2015	15023	EM	06 Sept	1	-	-	-	-	-	-	14.0	5.0
2015	15024	VV	23 Sept	1	-	-	-	-	-	-	16.7	7.0
2015	15025	VV	10 Sept	1	-	-	-	-	-	-	7.3	1.0
2015	15026	EM	09 Sept	1	-	-	-	-	-	-	-	-
				Mean	177.1	28.5	33.4	20.3	93.5	1.5	10.3	3.8
				± SE	± 22.3	± 7.3	± 10.0	± 6.0	± 13.8	± 0.9	± 1.1	± 1.1

Table S2. Results for dimensional reduction of nest characteristics with PCA.

Correlation Coefficient Matrix

	Eggs	Larvae	Pupae	Empty	Parasitised	Females	Males
Eggs		0.91	0.72	-0.34	-0.07	0.78	0.55
Larvae	0.91		0.75	-0.31	-0.08	0.66	0.57
Pupae	0.72	0.75		-0.01	-0.07	0.7	0.93
Empty	-0.34	-0.31	-0.01		-0.27	0.05	0.05
Parasitised	-0.07	-0.08	-0.07	-0.27		-0.1	-0.1
Females	0.78	0.66	0.7	0.05	-0.1		0.52
Males	0.55	0.57	0.93	0.05	-0.1	0.52	

mean r of variables in which $r > 3 = 0.71 \pm 0.04$

mean r of number of empty cells to other variables = -0.14 ± 0.08

mean r of number of parasitised cells to other variables = -0.12 ± 0.03

Bartlett's Test

K-squared = 115.46, $p < 0.001$

KMO statistic

overall = 0.61

per variable

Eggs	0.65
Larvae	0.60
Pupae	0.60
Females	0.62
Males	0.56

PCA

component with eigenvalue > 1 (76.94% of variance)

eigenvalue = 3.844

communalities range = 0.656 to 0.871

component loadings

Eggs	0.907
Larvae	0.892
Pupae	0.933
Females	0.837
Males	0.811

Table S3. Minimum age of maturation in male Hymenptera. 1 = complete sperm transfer into seminal vesicles; 2 = only in 10% of trials did males aged zero to one-day-old mate, compared to 80% of males older than two days.

Level of Sociality	Family	Species	Definition of Maturity	Minimum Age	Reference
Solitary Parasitoid	Braconidae	*Fopius vandenboschi*	Successful Mating	zero-days-old	Ramadan et al., 1991
		Fopius arisanus	Successful Mating & Complete Reproductive Maturation	two or four-days-old	Ramadan et al., 1992; Quimio & Walter, 2000
	Ichneumonidae	*Diadegma semiclausum*	Mating Occurrence	< 12 hours	Khatri et al., 2008
Social	Vespidae	*Polistes lanio*	Complete Reproductive Maturation	16 days-old (note - 1)	Gobbi, 1975 in Giannotti, 2004
	Apidae	*Bombus terrestris*	Mating Occurrence	six or 10 days-old	Duchateau & Mariën, 1995; Tasei et al., 1998
Highly Social	Apidae	*Apis mellifera*	Complete Reproductive Maturation	12 or 16 days-old	Ruttner 1976; Rhodes, 2002
	Vespidae	*Vespa velutina*	Complete Reproductive Maturation	10.3 days-old (mean)	Poidatz et al., 2017
	Formicidae	*Linepithema humile*	Mating Occurrence	zero-days-old to one-day-old (note - 2)	Passera & Keller, 1992

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Dataset 1. Project Data

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Figures

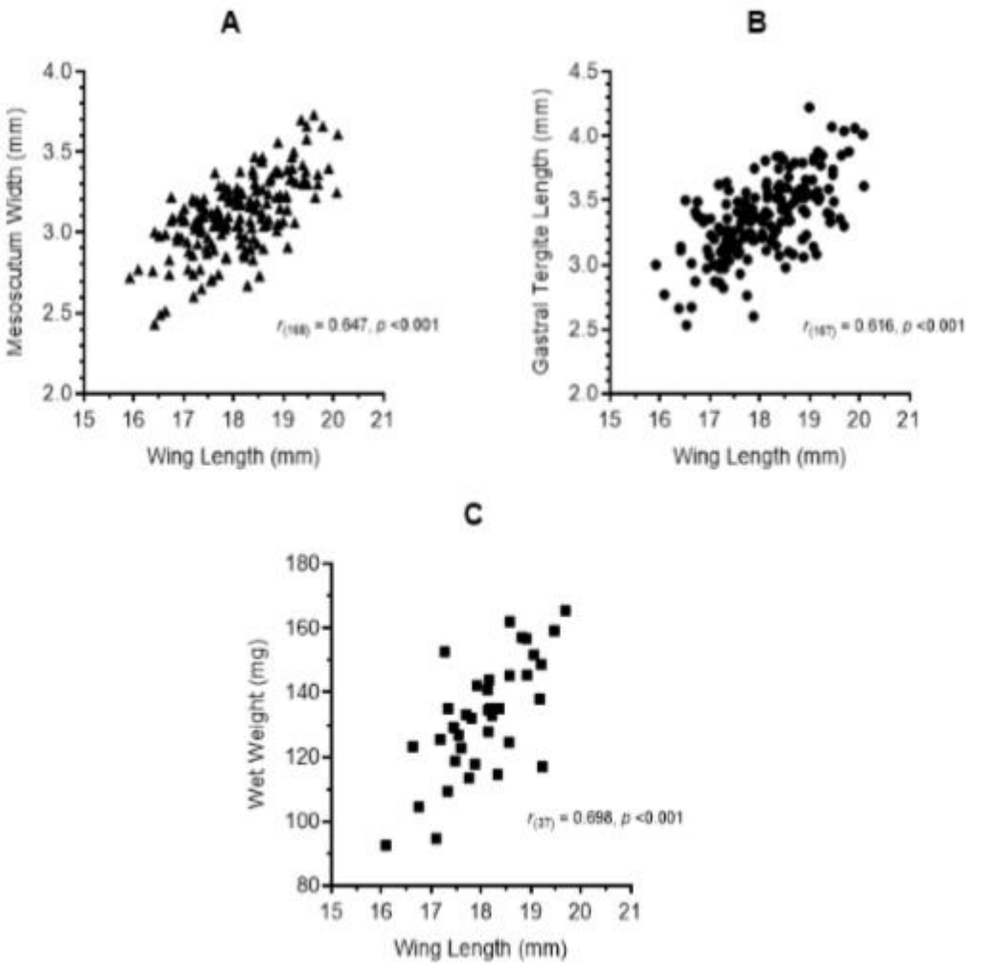

Figure S1. Wing length correlates with (A) mesoscutum width, (B) gastral tergite length and (C) wet weight of newly emerged zero-day-old males (Pearson's correlations, $\alpha = 0.05$, $p < 0.001$).

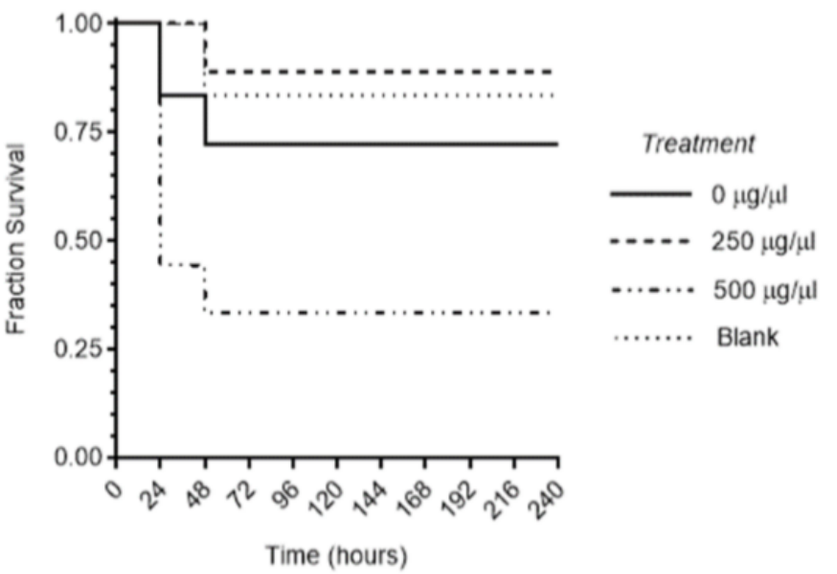

Figure S2. Significant (Cox2) higher morality hazard rates in males treated with 500 µg/µl of methoprene compared to blank control males ($p < 0.001$). Treatments 0 µg/µl and 250 µg/µl of methoprene not significantly different to blank control group. Survival analysis of males treated with 0, 250 or 500 µg/µl of methoprene in acetone, and a blank control, to select a suitable dosage for further testing.