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### Supplementary Material

**Observations on populations of a small insectivorous bird, *Malurus leucopterus leuconotus* Dumont, after an application of two ultra-low-volume (ULV) insecticides, fenitrothion and fipronil, in arid Australia**

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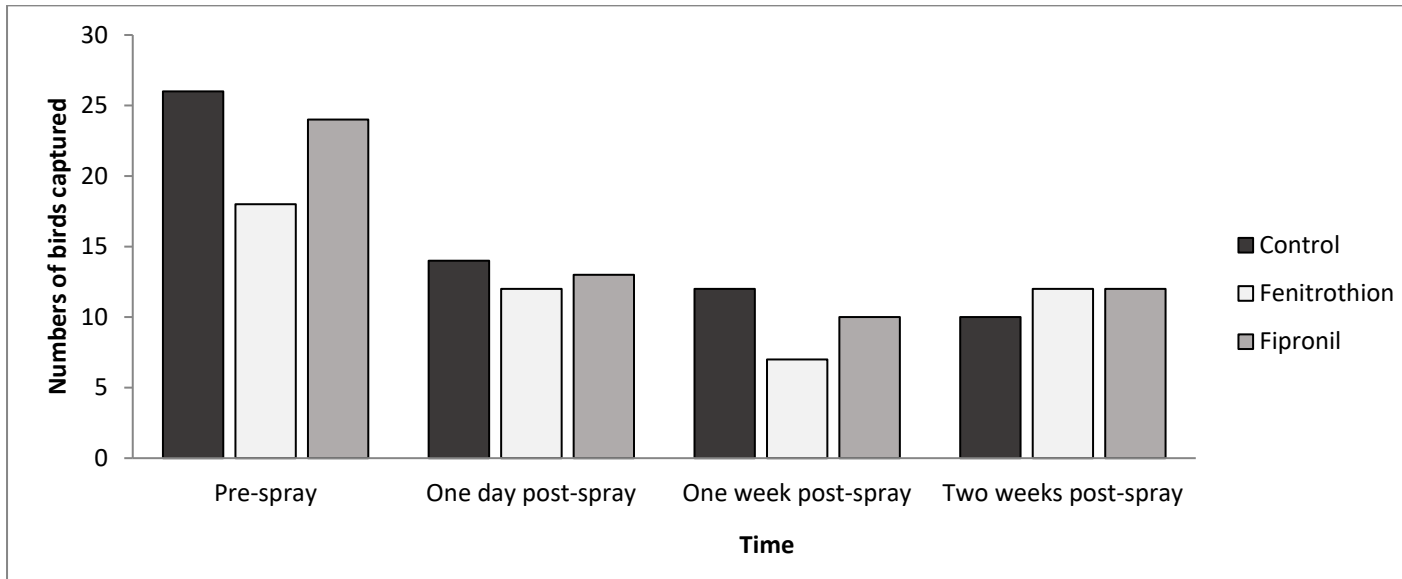
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**Table S1: Pesticide spray application data.** See manuscript text for pesticide manufacturer information and aerial spray methodology details.

Treatment	Date	Area treated (km <sup>2</sup> )	Application rate (mL a.i. ha <sup>-1</sup> )	Approximate spray height (m)	Track spacing (m)	Volume used (L)	Ambient air temperature (°C)	Wind direction	Approximate wind speed (m s <sup>-1</sup> )
Fipronil (3.0 UL)	12 Feb 2018	427.1	420	10	300	57	34.5	230-240	4-5
Fenitrothion	14 Feb 2018	462.6	210	10	100	99	26	180	6



**Figure S1: Bird capture numbers for each treatment group at times within each monitoring period.** For birds captured at fipronil sites, the one day post-spray category is represented by individuals captured on both days one (n=7) and four (n=6) post-spray. Day one fenitrothion birds were captured on day one (n=10) and day three (n=2) post-spray. These groupings were used as it was not logistically possible to capture birds at multiple treatment sites on exactly one day post spray. All other groupings represent birds captured 7-8 days post-spray (One week), and 14-16 days post-spray (Two weeks). For ChE analysis only, a subset of captures within all post-spray times were pooled due to low sample sizes.

**Table S2: Reduced models for all bird condition measures**

Models which best described variation in the datasets had non-significant terms removed as long as AICc measures continued to decline. Most three-way (sex\*time\*treatment) interaction terms could not be included in full models, as not enough males captured at fenitrothion sites during post spray (n=1 male at day one and week one).

Linear mixed models				
SBMI full model AICc 341, reduced model AICc 286				
Factor	DF Num	DF Den	F Ratio	Prob > F
Treatment	2	3	0.617	0.595
Time	3	150	5.266	0.002
Capture time	1	150	12.111	0.001*
Treatment*Time	6	150	2.152	0.051*
Time*Capture time	3	150	2.276	0.082
Blue chroma feather reflectance full model AICc 324, reduced model AICc 309				
Factor	DF Num	DF Den	F Ratio	Prob > F
Treatment	2	3	0.225	0.811
Time	3	148	5.189	0.002**
Treatment*Time	6	148	2.140	0.052
Sex	1	147	47.133	<.0001**
Treatment*Sex	2	147	2.710	0.070
Feather bar width full model unbalanced, reduced model AICc -124				
Factor	DF Num	DF Den	F Ratio	Prob > F
Treatment	2	119	50.077	<.0001**
Time	3	119	1.122	0.343
Treatment*Time	6	119	2.347	0.035†
Ordinal logistic models				
Fat score full model AICc 416, reduced model AICc 405				
Factor	DF	L-R ChiSquare	Prob>ChiSq	
Treatment	2	17.202	0.0002**	
Time	3	3.875	0.275	
Treatment*Time	6	3.851	0.697	
Sex	1	0.095	0.757	
Time*Sex	3	10.859	0.013*	
Site[Treatment]	3	7.135	0.068	
Muscle score full model AICc 387, reduced model AICc 370				
Factor	DF	L-R ChiSquare	Prob>ChiSq	
Treatment	2	1.816	0.403	
Time	3	18.160	0.0004**	
Treatment*Time	6	5.678	0.460	
Haematocrit full model AICc 523, reduced model 520				
Factor	DF	L-R ChiSquare	Prob>ChiSq	
Treatment	1	2.862	0.091	
Time	3	2.761	0.430	

Treatment*Time	3	5.093	0.165
Sex	1	0.672	0.412
Treatment*Sex	1	2.895	0.089
Site[Treatment]	2	6.560	0.038

\*\*significant difference based on bonferonni adjustment ( $p < 0.008$ )

\*post-hoc tests suggested there were significant differences, despite  $p > 0.008$

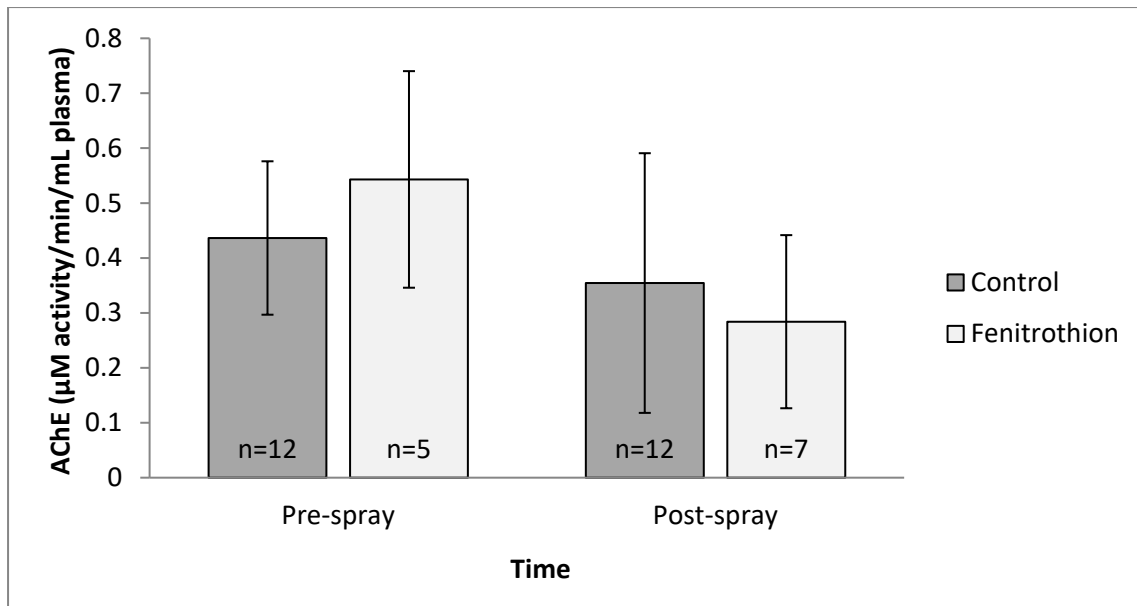
† post-hoc tests could not determine where differences were significant

**Table S3: Fenitrothion vs Control AChE activity levels**

Linear mixed model, AICc 80 (n=36)

Factor	DF Num	DF Den	F Ratio	Prob > F
treatment	1	32	0.072	0.789
time	1	32	6.443	0.016*
treatment*time	1	32	1.735	0.197

\*AChE activity decreased over time at all sites



**Supplementary Figure S2:** Mean plasma acetylcholinesterase (AChE) activity ( $\pm$ SD) at control and fenitrothion sites before and after spray application. Mean values for all birds captured at control sites were  $0.395 \pm 0.194$  SD, 95% CI 0.313 – 0.478 (n=24), while values for birds at fenitrothion sites were  $0.392 \pm 0.213$  SD, 95% CI 0.256 – 0.527 (n=12). Only two samples at fenitrothion sites were taken within one day of pesticide application, while the other five were taken at two weeks postspray. The null results reported here could therefore be due to recovery of most individuals after exposure.