Supplementary Figures and Tables

Supplementary Figure 1

Figure 1. Odour 'headspace' sampling of *B. pinnata* for GC-MA analysis. a) Polyacetate oven bag over a single *B. pinnata* branch. Odour headspace was allowed to accumulate in the bag for 15 minutes prior to sampling. b) Air was extracted from the bag for 15 minutes through a thermal desorption tube filled with 200 mg of Tenax TA using a PAS500 Personal Air Sampler.

Supplementary Figure 2

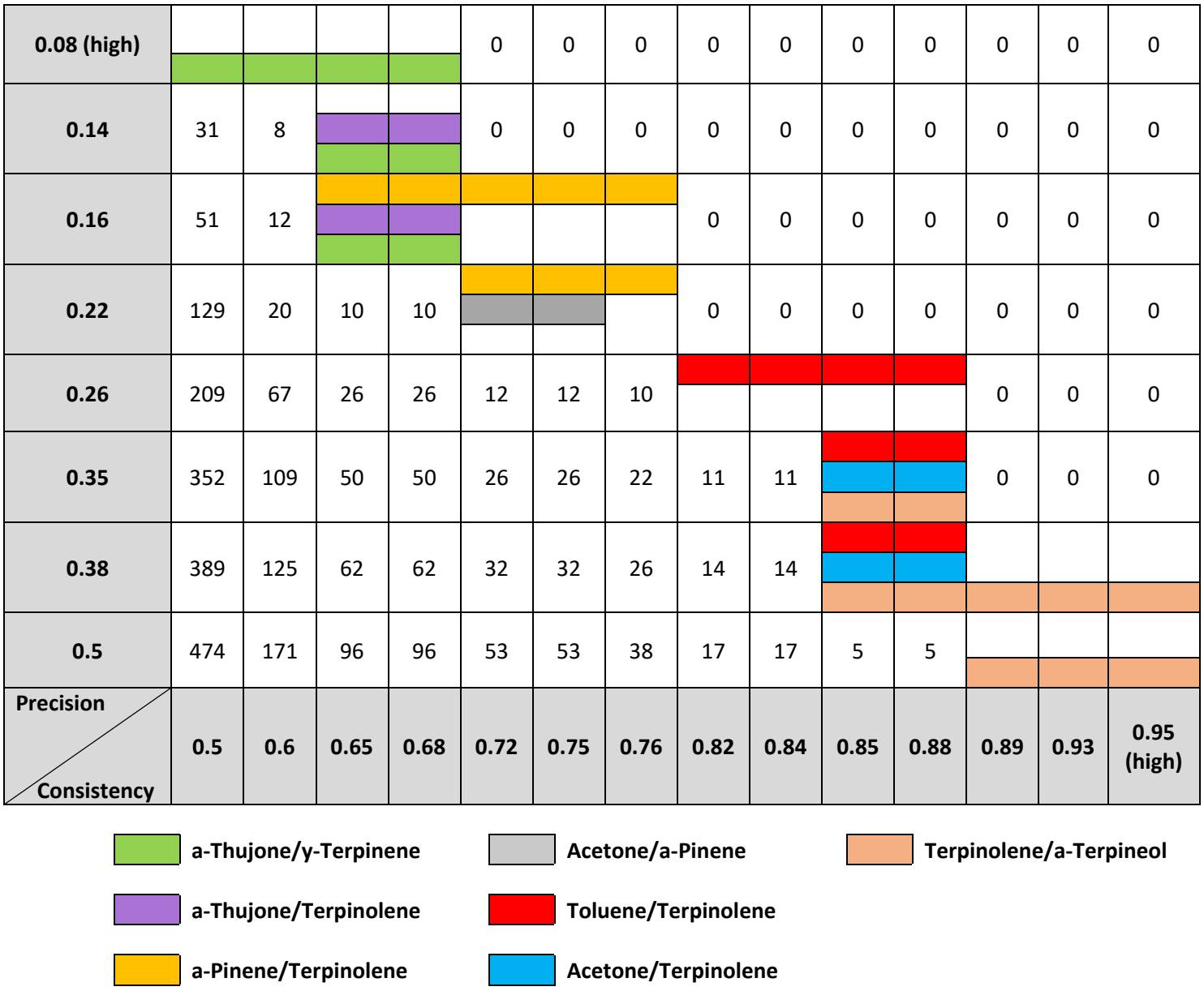

Figure 2. Informative pairs of volatile organic compounds (VOCs) identified from *B. pinnata* presented in a consistency-precision reliability space. Here, values for the two 'Rules of reliability' are present on a scale of consistency (threshold baseline 0.5 to high consistency 0.95) and precision (threshold baseline 0.5 to high precision 0.08). Specific VOC pairs, presented in a unique colour, are shown when one to three pairs were detected. Where a cell contains the number 0, no pairs were identified. Where more than three pairs were identified, the number of pairs is shown.

Supplementary Figure 3

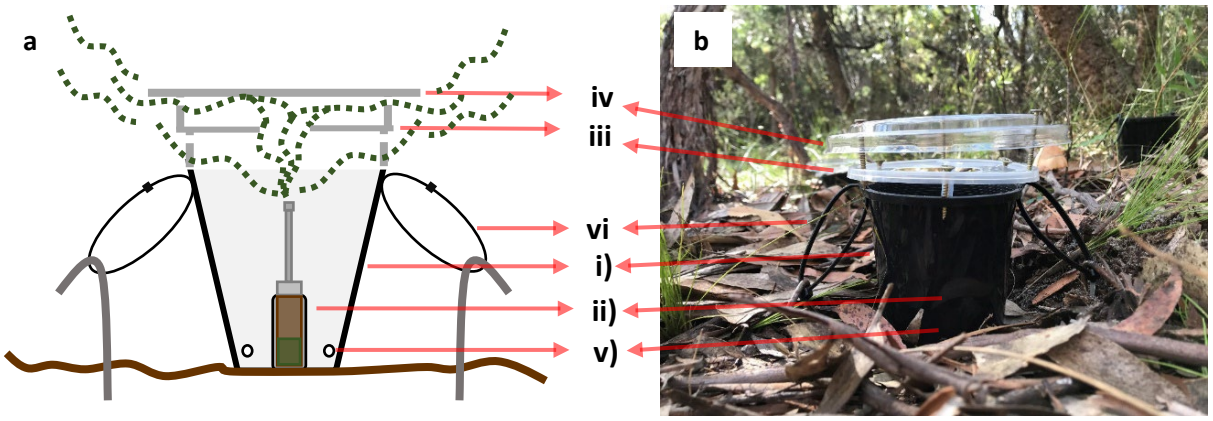

Figure 3. a) A longitudinal schematic of a virtual neighbour odour dispenser (i) a black plastic 200 mm 'Garden City Plastic Grow Plant Pot' with a (ii) 2 cm piece of 19 mm black poly pipe inserted inside to securely fit a single vial. 5 mm above the open pot, using screws we attached a (iii) 220 mm round clear plastic lid with a 50 mm hole cut centrally above the vial to allow the odour from vials to escape. We placed (iv) an intact, larger 300 mm round clear plastic lid 5 mm above the first lid as a secondary rain guard. (v) Three small holes were drilled into the base of the pots to act as a flue to produce an air draft to help disperse odour from vials. (vi) Two 300 × 4.8 mm black cable ties were attached to the sides of each pot, which acted as an anchor point for tent pegs which were used to secure VNHs to the ground. Odour being emitted from vials is depicted as dashed green lines. **b)** A virtual neighbour holder attached to the ground in-situ at our study site.

Supplementary Figure 4

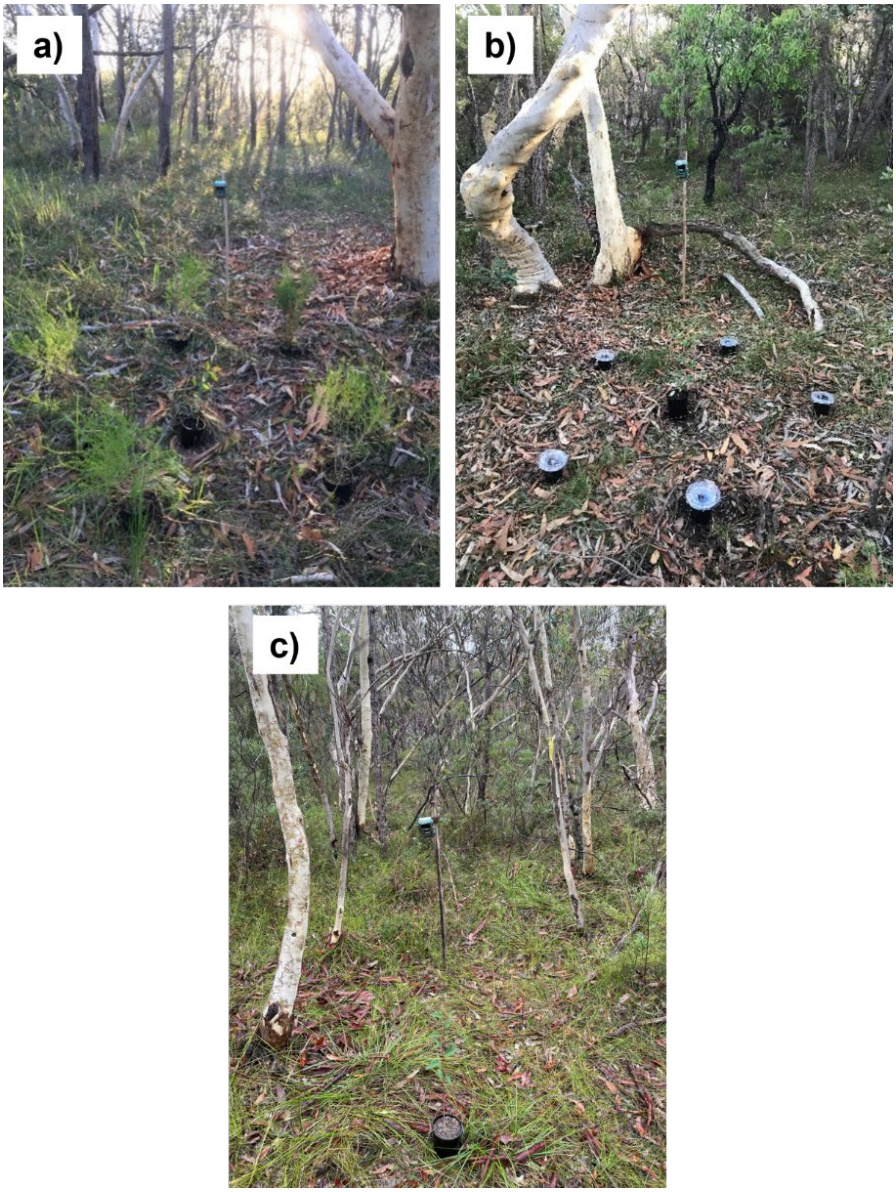

Figure 4. Associational refuge main trial treatments (a) real neighbourhood treatment of a single *E. punctata* surrounded by five *B. pinnata*, (b) virtual neighbourhood manipulation treatment of a single *E. punctata* surrounded by five virtual neighbour odour dispensers, (c) untreated control, a single *E. punctata* on its own, against background vegetation. Images show experimental set up of motioned-triggered cameras fastened to wooden stakes (camera height = 0.7 m, distance to seedling = 1.5 m) at an approximate 45° angel towards the focal seedlings.

Supplementary Figure 5

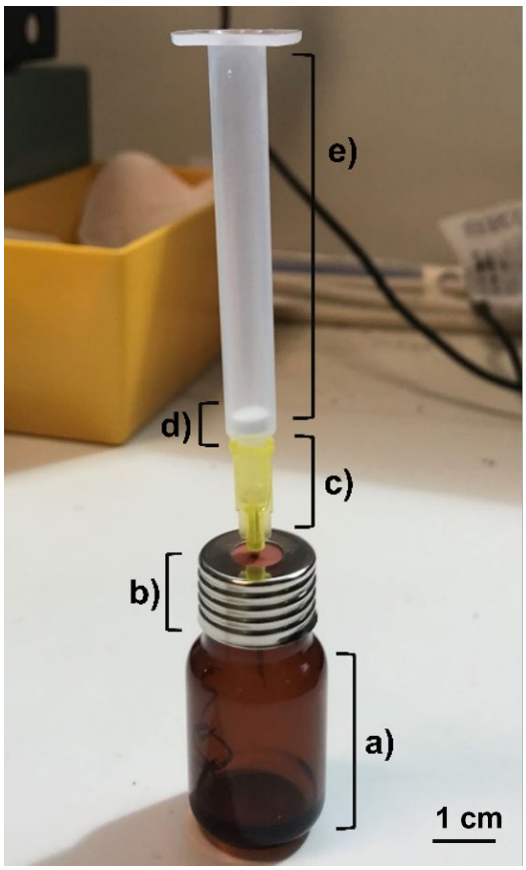

Figure 5. A virtual neighbour vial comprising 2.96 ml VOC compound mixture in a (a) 10 mL glass amber vial, sealed with (b) PTFE lined butyl septa headspace cap. Vials are pierced with a diffusion tube made from a (c) 20 gauge syringe needle attached to a (e) polypropylene SPE tube containing a (d) 20µ porosity PE frit to limit the diffusion rate. Design based on [1].

Supplementary Figure 6

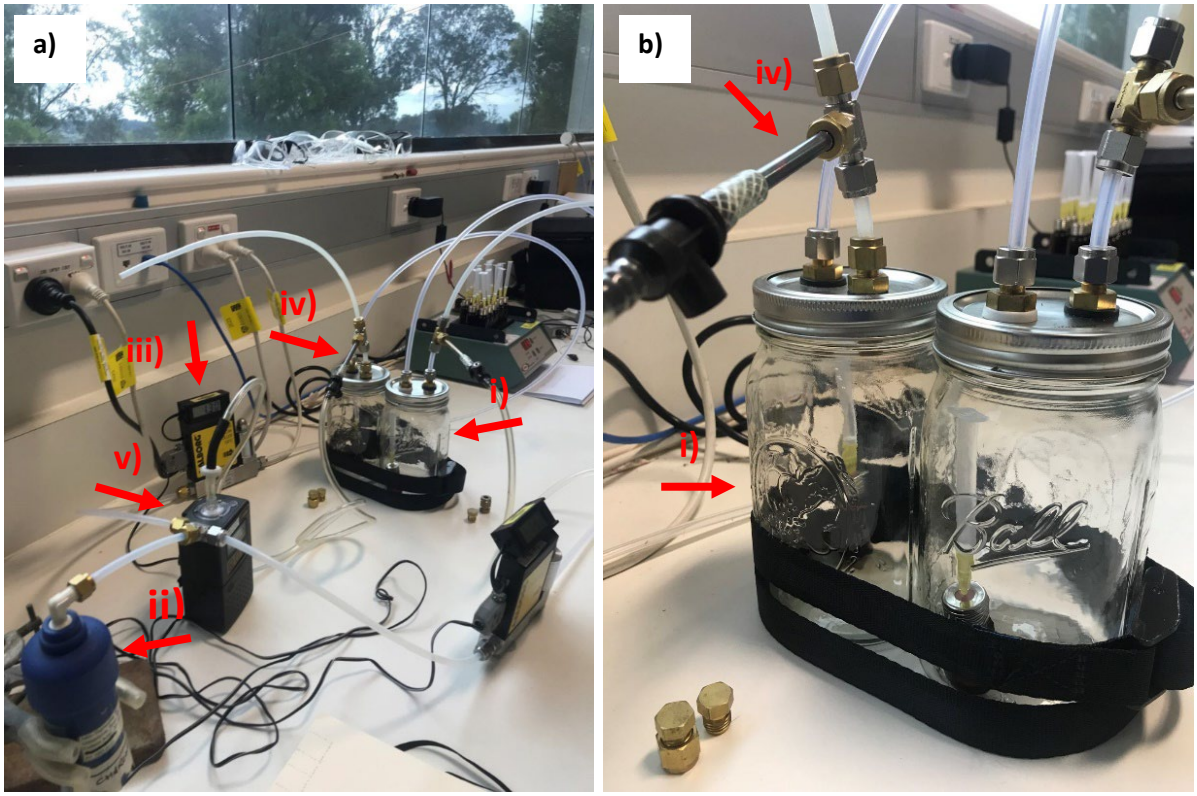

Figure 6. Virtual neighbour VOC sampling using (i) one litre glass Mason jars with lids fitted with ¼" brass bulkhead fittings to allow air in and out of the jar. Instrument air, passed through an activated charcoal scrubber (ii), was supplied to the Mason jar at 1.3 L min-1 using a mass flow controller (iii). VOCs were collected from the jar outlet using a sorbent tube containing 200 mg Tenax TA (iv) connected to an air pump (v) flowing air at 70 mL min-1 for 15 minutes.

Supplementary Figure 7

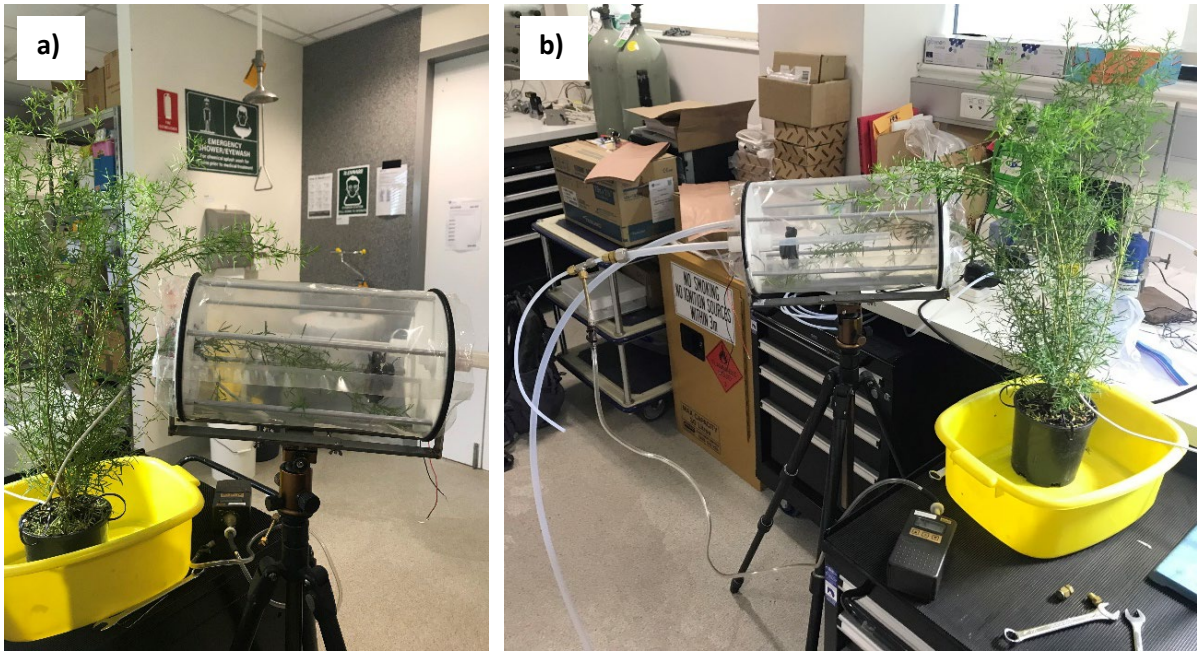

Figure 7. Sampling *B. pinnata* VOC emission rate. a) Here, a single branch of a *B. pinnata* was paced inside a custom-built branch enclosure chamber. b) An air pump, connected to the chamber via plastic tubing draws air out of the chamber, and through a sorbent tube where the VOCs emitted by the branch are collected. Later, sorbent tubes were run through GC-MS to determine VOCs emitted and to calculate 'branch' emission rate. Total above ground plant dry weight (g) was divided by branch dry weight and then multiplied by branch emission rate to give total plant emission rate (mg VOC / hour).

Supplementary Table 1

Table 1. Compound volumes used in virtual neighbour treatments, adjusted for exact compound concentration and volume to match real *B. pinnata* VOC paired proportions and emission rate. All virtual neighbour vials were mixed to a volume of 2.96 mL

	α-Thujone	*γ-Terpinene*	*Terpinolene*	*α -Pinene*	*Acetone*	*Toluene*	*α -Terpineol*
Informative	482.1 µL	755.0 µL	1445.0 µL	93.7 µL	0.1 µL	0.4 µL	184.0 µL
Flipped proportion	5.3 µL	0.3 µL	0.1 µL	0.4 µL	2461.6 µL	218.1 µL	274.2 µL
	D-Limonene	*(1R)-(-)-Myrtenal*	*Nonanoic acid*	*β-Myrcene*	*Tridecane*	*3-Pentanone*	*Geraniol*
Uninformative	187.7 µL	1.0 µL	1.1 µL	74.2 µL	2.1 µL	0.2 µL	2693.6 µL

Supplementary Table 2

Table 2i. Virtual neighbourhood time to first wallaby browsed hazard ratios for pairwise comparisons between individual treatments. Hazard ratios indicate the likelihood that a treatment (first listed) will be browsed in comparison to another (second listed). High hazard ratios indicate a higher probability of being browsed.

Pairwise comparison	**Hazard ratio**	**p-value**
Untreated control (no neighbours) vs Informative odour (× 5)	**19.79**	**< 0.0001**
Untreated Control (no neighbours) vs Real *B. pinnata* (× 5)	**17.10**	**< 0.0001**
Real *B. pinnata* (× 5) vs Informative odour (× 5)	1.16	0.72
Flipped proportion odour (× 5) vs Informative odour (× 5)	**12.39**	**< 0.0001**
Uninformative odour (× 5) vs Informative odour (× 5)	**22.95**	**< 0.0001**
Procedural control (empty dispenser × 5) vs Informative odour	**22.26**	**< 0.0001**
Flipped proportion odour (× 5) vs Real *B. pinnata* (× 5)	**10.71**	**< 0.0001**
Uninformative odour (× 5) vs Real *B. pinnata* (× 5)	**19.84**	**< 0.0001**
Procedural control (empty dispenser × 5) vs Real *B. pinnata* (× 5)	**19.24**	**< 0.0001**
Uninformative odour (× 5) vs Flipped proportion odour (× 5)	1.85	0.11
Procedural control (empty dispenser × 5) vs Flipped proportion odour (× 5)	1.80	0.15
Untreated control (no neighbours) vs Flipped proportion odour (× 5)	1.60	0.27
Procedural control (empty dispenser × 5) vs Uninformative odour (× 5)	0.97	0.93
Untreated control (no neighbours) vs Uninformative odour (× 5)	0.86	0.71
Untreated control (no neighbours) vs Procedural control (empty dispenser × 5)	0.89	0.76
Hazard Ratio (HR) indicators: HR = 1: no effect HR < 1 = reduction in hazard (for first listed treatment) HR > 1 = increase in hazard (for first listed treatment)		

Table 2ii. Of patches browsed, summary of median time to first wallaby browse in days, standard error (S.E) and number of browsing visits (N. visits).

Treatment	**Median (days)**	**S.E.**	**N. visits**
Untreated control (no neighbours)	1.3	0.50	13
Informative odour (× 5)	14.51	2.06	13
Real *B. pinnata* (× 5)	9.81	1.20	12
Flipped proportion odour (× 5)	2.55	0.77	15
Uninformative odour (× 5)	0.77	0.20	15
Procedural control (empty dispensers × 5)	1.69	0.45	14

References

1 Shinohara, N. *et al. International Journal of Environmental Research and Public Health* **7**, 3348-3358, (2010).