Supplemental Materials S1

Odorant stimuli

The quantity and delivery method for each odorant were determined according to preliminary experiments. For Neroli, Lirio and larval host plants we used amount of the odorant source that could induce any effect in innate color preference, whereas for others we used the amount that humans could detect their smell. For Neroli and Lavender, 200 μl of essential oil in a small cup was allowed to diffuse throughout the entire period of those colour preference tests (about two weeks). In the case of Lirio, 5 μl of essential oil was put on a small piece of filter paper 30 min before beginning tests, and this was replaced hourly. For *Hibiscus* or *Citrus*, six potted trees were put in the room throughout the whole test period. 10 μl of synthetic mimics were delivered in the same manner as the Lirio.

Chemical analysis of plant scents and preparation of synthetic mimics

We first measured the concentrations of volatile organic compounds (VOCs) in plant scents (*Citrus unshiu* (Rutaceae) trees and Nelori) to confirm previous reports [1, 2]. Based on this data, we then prepared synthetic mimics.

Sample preparation

The VOCs present in the essential oil of Neroli were collected by static headspace sampling with a solid phase microextraction (SPME) syringe and a 100 mm polydimethylsiloxane fiber (Supelco). An aliquot of each essential oil (100 μl) was deposited in a glass test tube (130 mm×19 mm OD) and the headspace volatiles were adsorbed with a SPME fiber for 2 min. The inner air of an empty test tube was also collected as a blank sample in the same manner.

The VOCs of *Citrus unshiu* (Rutaceae) plants were collected by dynamic headspace sampling in the laboratory. Undamaged plant branches of *C. unshiu* with 30 leaves, which were put into an100-mL Erlenmeyer flask containing 30 ml of distilled water, were placed in a separable glass container (200 mm×110 mm ID). Plant VOCs were trapped with a Supelco ORBO 32 adsorbent tube (100 mm×8 mm OD, 600 mg of activated charcoal) for 8 h using a membrane pump at a flow rate of 5 l/min. The container had an air inlet equipped with an activated charcoal filter, from which purified ambient air was allowed into the container. Sampling was repeated twice using different branches for each plant. To distinguish between plant VOCs and contaminants, the inner air of an empty container was collected as a blank sample in the same manner. Collected volatiles were extracted from the adsorbents with 10 ml of purified isopentane / diethyl ether (4:1 v/v). The extracts were concentrated by N_2 flow to 100 μl and stored at –20 ºC until the chemical analyses.

Chemical analyses

Gas chromatography-mass spectrometry (GC-MS) analyses were performed using a Shimadzu QP5000 mass spectrometer coupled with a Shimadzu GC-17A gas chromatograph. All samples were analyzed by splitless injection (1 min, a helium flow of 2.2 ml/min) using a Varian CP-Wax 58CB capillary column (25 m×0.25 mm ID, 0.25 μm film thickness) at an injector temperature of 230 ºC and an EI ionization voltage of 70 eV. GC-MS analyses for ORBO 32 samples were conducted using an oven temperature program of 40 ºC (2 min isothermal) and raising rate of 5 ºC/min to 230 ºC, while those for SPME samples were performed using an oven temperature program of 40 ºC (1 min isothermal) and raising rate of 5 ºC/min to 200 ºC. Plant VOCs were determined by subtracting the compounds (possible contaminants) detected in blank samples and identified by comparing retention times and mass spectra to those of authentic samples and from the literature [1-3].

Preparation of synthetic mimics

Two types of synthetic mimics were prepared from authentic samples of the plant VOCs identified by GC-MS analyses. The synthetic mimic of Neroli was a mixture of 10 authentic samples (table S1). The synthetic mimic of *C. unshiu* consisted of 11 authentic samples (table S2). Authentic samples were commercially purchased from Tokyo Chemical Industry (Tokyo, Japan) and Sigma-Aldrich (St. Louis, USA).

Statistical analysis

To ascertain whether the distribution of visits among the four colours was random, we used multinomial tests. In the cases where it was nonrandom ($p<0.05$), binomial tests adjusted by Bonferroni's correction were performed for all colour pairs.

Fisher's exact test was used to compare the distributions of visits among the four colours between under a particular odorant versus the control. When the distribution was different ($p<0.05$), for each colour X we aggregated data (colour X versus the other colours) and performed Fisher's exact test to determine whether the odor significantly increased / decreased attraction to that colour.

We used an analogous approach to compare the distributions of visits between sexes rather than odor conditions.

Reference

1. Gholivand, M.B., Piryaei, M., and Abolghasemi, M.M. 2013. Analysis of volatile oil composition of *Citrus aurantium* L. by microwave-assisted extraction coupled to headspace solid-phase microextraction with nanoporous based fibers. *J Sep Sci* **36,** 872-877. (doi:10.1002/jssc.201200674)

2. Miyazawa, N., Fujita, A., and Kubota, K. (2010). Aroma character impact compounds in Kinokuni mandarin orange (*Citrus kinokuni*) compared with Satsuma mandarin orange (*Citrus unshiu*). *Biosci, Biotech, Biochem* **74**, 835-842. (doi: 10.1271/bbb.90937).

3. Adams, R. P. (2009). *Identification of Essential Oil Components by Gas Chromatography/Mass Spectrometry, 4th Ed.*, pp. 804. Illinois, USA., Allured Business Media.

Table S1 Chemical compositions of volatile organic compounds in essential oils of Neroli;*Citrus aurantium* and synthetic mimic of Neroli.

No.	RT (min)	Compound	Measurement		Synthetic mimic
			Content (%)	Identification[1]	Ratio
1	1.9	**α-Pinene**	3.5	Std	14
2	2.1	**α-Thujene**	1.3	Ref	—
3	2.3	**Camphene**	0.3	Std	1
4	2.9	**β-Pinene**	21.1	Std	81
5	3.1	**Sabinene**	2.6	Ref	—
6	3.5	**δ-3-Carene**	0.2	Ref	—
7	3.8	**β-Myrcene**	2.0	Std	8
8	4.5	**Limonene**	26.1	Std	100
9	4.5	**1,8-Cineol**	2.4	Std	—
10	5.2	**β-Ocimene**	0.1	Std	—
11	5.6	**3-Octanone**	0.3	Std	—
12	5.8	***p*-Cymene**	10.3	Std	40
13	6.1	**Hexyl acetate**	0.6	Std	—
14	7.0	**(*Z*)-3-Hexenyl acetate**	0.1	Std	—
15	7.5	**6-Methyl-5-hepten-2-one**	0.1	Std	—
16	7.9	**1-Hexanol**	0.05	Std	—
17	8.5	**1-Octen-3-yl acetate**	0.4	Std	—
18	9.5	**(unknown)**	0.03		—
19	9.8	***cis*-Linalool oxide furanoside**	2.2	Std	15
20	10.5	***trans*-Linalool oxide furanoside**	1.6	Std	—
21	12.7	**Linalool**	20.6	Std	79
22	12.8	**Linalyl acetate**	3.5	Std	13
23	13.7	**Terpinen-4-ol**	0.1	Std	—
24	16.1	**α-Terpineol**	0.5	Std	2

[1]Std and Ref denote identification based on authentic samples and published data, respectively [3].

Table S2. Chemical compositions of volatile organic compounds identified from fresh leaves of *Citrus unshiu* and synthetic mimic of *C. unshiu* scent.

No.	RT (min)	Compound	Measurement		Synthetic mimic
			Relative abundance[1]	Identification[2]	Ratio
1	4.3	**3-Heptanone**	2.9	Std	3
2	4.6	**α-Terpinene**	1.6	Std	2
3	5.0	**Limonene**	7.6	Std	8
4	5.5	**Dodecane**	3.2	Std	—
5	6.0	**γ-Terpinene**	100	Std	100
6	6.2	**β-Ocimene**	2.7	Ref	—
7	6.5	***p*-Cymene**	27.2	Std	30
8	6.8	**α-Terpinolene**	2.3	Std	1
9	7.8	**(*Z*)-3-Hexenyl acetate**	3.8	Std	4
10	8.3	**6-Methyl-5-hepten-2-one**	3.0	Std	3
11	9.7	**Nonanal**	0.6	Std	1
12	10.3	**Tetradecane**	0.9	Std	—
13	13.6	**Linalool**	4.7	Std	5
14	14.3	**Isocaryophyllene**	2.0	Ref	—
15	14.5	**β-Caryophyllene**	1.8	Std	4
16	16.2	**α-Caryophyllene**	0.5	Ref	—
17	18.4	**Germacrene D**	0.4	Ref	—

[1]Due to the presence of various contaminants in the extracts of adsorbents after sampling, the quantity of each compound identified was represented in relative abundance, which was calculated based on the total ion intensity of γ-tepinene as 100.

[2]Std and Ref denote identification based on authentic samples and published data [3], respectively.

Table S3 Number of individuals visiting each of the four colours in different ambient odour conditions, and statistical analysis of distribution of individuals visiting the colours in each condition. Multinomial tests are used to test for nonrandom visit distributions over the four colours. Binominal tests are used to compare visit frequencies between pairs of colours.

	Number of individuals for each color					P-value[a]	Adjusted P-value[b]					
Odorant	Blue	Green	Yellow	Red	**Total**	**Four colors [a]**	**Blue [b] Green**	**Blue [b] Yellow**	**Blue [b] Red**	**Green [b] Yellow**	**Green [b] Red**	**Yellow [b] Red**
Female												
No odorant	31	5	13	3	**52**	**0.001**	**< 0.001**	**0.029**	**< 0.001**	0.289	1	0.064
Neroli	11	2	13	17	**43**	**0.046**	0.067	1	1	**0.022**	**0.002**	1
Lirio	20	3	7	14	**44**	**0.039**	**0.001**	0.057	1	1	**0.038**	0.568
Lavender	36	4	4	3	**47**	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**	1	1	1
Hibiscus	27	3	8	2	**40**	**0.001**	**< 0.001**	**0.006**	**< 0.001**	0.68	1	0.328
Citrus trees	25	16	6	4	**51**	**0.010**	0.633	**0.003**	**< 0.001**	0.157	**0.035**	1
Citrus trees, Neroli	32	27	11	6	**76**	**0.003**	1	**0.006**	**< 0.001**	**0.042**	**0.001**	0.997
Artificial Neroli	22	6	17	2	**47**	**0.004**	**0.011**	1	**< 0.001**	0.104	0.867	**0.002**
Artificial *Citrus* trees	30	3	7	2	**42**	**< 0.001**	**< 0.001**	**0.001**	**< 0.001**	1	1	0.539
Mascara *Citrus* trees, Neroli	21	4	7	4	**36**	**0.032**	**0.003**	**0.038**	**0.003**	1	1	1
Mascara *Citrus* trees	27	2	5	2	**36**	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**	1	1	1
Male												
No odorant	41	1	16	5	**63**	**< 0.001**	**< 0.001**	**0.004**	**< 0.001**	**0.001**	0.656	0.08
Neroli	22	0	16	8	**46**	**< 0.001**	**< 0.001**	1	**0.048**	**< 0.001**	**0.023**	0.455
Lirio	33	0	12	6	**51**	**< 0.001**	**< 0.001**	**0.007**	**< 0.001**	**0.001**	**0.094**	0.714
Lavender	32	1	5	3	**41**	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**	0.656	1	1
Hibiscus	32	1	5	3	**41**	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**	0.656	1	1
Citrus trees	49	2	18	5	**74**	**< 0.001**	**< 0.001**	**0.001**	**< 0.001**	**0.001**	1	**0.032**
Citrus trees, Neroli	62	0	6	3	**71**	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**	0.094	0.750	1
Artificial Neroli	37	0	5	3	**45**	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**	0.188	0.750	1
Mascara *Citrus* trees, Neroli	34	1	11	2	**48**	**< 0.001**	**< 0.001**	0.192	**< 0.001**	**< 0.001**	1	**< 0.001**

a: Multinomial test; null hypothesis: visitations are random.
b: Binominal test (exact, Bonferroni correction); null hypothesis: neither color is preferred over the other.