SUPPORTING INFORMATION

Oviposition by the oriental fruit fly, *Bactrocera dorsalis* (Hendel) (Diptera: Tephritidae) on five citrus types in a laboratory

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Table S1. Ethogram of sexually mature, mated female *B. dorsalis* displayed on five ripe citrus types and a positive control under undamaged and damaged conditions.

Behaviour	Description
Walking	Forwards, backward or circular locomotion on the fruit using legs.
Tasting	Extension and retraction of mouthparts to and from the surface of fruit. This may happen while the female is walking.
Feeding	Fly appeared to imbibe fruit juice from a puncture of the fruit surface.
Grooming	Use of either the fore legs to clean the head area, or the hind legs to clean the abdomen, wings and ovipositor.
Stationary	No observable movement by fly on the fruit for two seconds or longer.
Wing beating (Shimmy)	Rapid elevation and depression of wings while simultaneously, rapidly moving side-ways, similar to calling displayed by males.
Probing	Full extension of ovipositor, abdomen raised above the head. The abdomen curved towards the body to position the ovipositor perpendicular to the fruit surface before being forced downward. This would occur multiple times, successively. This behaviour was present even when females made use of a hole intentionally made in the fruit. Probing did not always result in oviposition since females were not always able to penetrate the fruit skin.
Oviposition	After probing, the ovipositor (aculeus) remained positioned in a hole, submerged up to the oviscape, in the fruit and the female remained in this position. This behaviour lasted from a few seconds up to a few hours. During oviposition females would rotate in a circular motion, using the ovipositor as a pivot point.
Ovipositor dragging (marking)	The focal female was observed to walk in random patterns with the aculeus tip extended on the surface of the fruit.
Aggression	Females would engage in head-butting and chasing each other around the fruit. Aggression during oviposition entailed head-butting, and would not necessarily result in the female leaving the oviposition site.

Table S2. Significant indicator compounds per fruit type. Significance level recorded as $p < 0.05$.

Fruit	Compounds	Indicator value	*p*-value
Eureka lemon	β-Bisabolene	0.967	0.005
	β-Pinene	0.840	0.005
	Benzenemethanol	0.756	0.005
	Citronellyl acetate	0.756	0.005
	Tetradecane	0.756	0.005
	Zingiberene	0.756	0.010
	α-Thujene	0.739	0.005
	Paracymene	0.736	0.020
	2,5-Hexanediol	0.655	0.015
	2,6-Octadienoic acid	0.655	0.020
	Butanoic acid	0.655	0.010
	cis-α-Bisabolene	0.655	0.020
	Citronellol	0.655	0.020
	endo-Borneol	0.655	0.020
	α-Bergamotene	0.651	0.020
	Bicycloheptane	0.632	0.025
Nadorcott mandarin	Epoxylinalol	0.971	0.005
	E,E-α-Farnesene	0.913	0.005
	cis-1,5-Cyclodecadiene	0.707	0.005
	L-carveol	0.707	0.015
	trans-p-Mentha-1(7),8-dien-2-ol	0.690	0.010
	Octane	0.684	0.025
	2-Decenal	0.664	0.010
Glen Ora navel orange	α-Fenchene	0.775	0.005
	Artemisia triene	0.738	0.005
	1,3-Benzenedimethanamine	0.652	0.020
	Mentha-1,4,8-triene	0.619	0.030
	Tetradecanal	0.605	0050
	β-Fenchene	0.562	0.030
Delta Valencia orange	Dodecanal-β-Pinene	0.707	0.015
	Nonyl aldehyde	0.651	0.025
Star ruby grapefruit	Acetic acid	0.784	0.005
	trans-Linalool oxide	0.782	0.005
	trans-Dihydrocarvone	0.754	0.005
	α-Humulene	0.753	0.005
	β-Saelinene	0.749	0.010
	α-Copaene	0.748	0.010
	α-Guaiene	0.707	0.005
	Cadine-1,4-diene	0.707	0.005
	Nootkatone	0.702	0.010
	α-Muurolene	0.685	0.035

Isopulegol	0.671	0.010
β-Eudesmol	0.612	0.045
ϒ-Selinene	0.612	0.025
(+)-(R)-ρ-Mentha-1,8(10)-dien-9-ol	0.612	0.025

Table S3. Significant indicator compounds by varying fruit ripeness. Significance level recorded as $p < 0.05$.

Degree of ripeness	Compounds	Indicator value	*p*-value
Green	β-Eudesmol	0.667	0.02
	cis-1,5-Cyclodecadiene	0.577	0.04
	Ethanol	0.577	0.05
Colour Break	6-Octen-1-ol	0.548	0.035
Ripe	2-Cyclohexen-1-one	0.603	0.04
Over Ripe	Camphor	0.807	0.010
	Valencene	0.773	0.020
	1,4-Hexadiene	0.707	0.025
	α-Bergamotene	0.700	0.010
	Verbenol	0.679	0.025
	β-Farnesene	0.653	0.045

Table S4. Number of replicates (from n=10) with stings (eggs) detected in citrus types at four stages of ripeness after exposure to five gravid female *B. dorsalis* under no-choice conditions (undamaged or damaged) in a laboratory. Ripe Golden Delicious apples were used as a control.

	Undamaged				Damaged			
Fruit type	Green	Colour break	Ripe	Over ripe	Green	Colour break	Ripe	Over ripe
Apple			**3**				**2**	
Delta	0	0	0	0	0	0	0	0
Eureka	0	0	**2**	0	0	0	**5**	**4**
Glen Ora	0	0	0	0	0	0	**1**	0
Nadorcott	0	0	0	0	**1**	0	**1**	0
Star Ruby	0	0	0	0	**1**	0	**1**	0

Table S5. Number of replicates (from n=10) with stings (eggs) detected in citrus types at four stages of ripeness after exposure to five gravid female *B. dorsalis* under choice conditions (undamaged or damaged) in a laboratory. Ripe Golden Delicious apples were used as a control.

	Undamaged				Damaged			
Fruit type	Green	Colour break	Ripe	Over ripe	Green	Colour break	Ripe	Over ripe
Apple			0				**1**	
Delta	0	0	0	0	0	0	**1**	0
Eureka	0	0	0	0	0	0	0	0
Glen Ora	0	0	0	0	0	0	0	0
Nadorcott	0	0	0	0	**2**	0	0	0
Star Ruby	0	0	0	0	0	0	0	0

Figure S1. First order Markovian analyses showing the probability of transition from one behaviour to another by gravid female *B. dorsalis* on (a) damaged and (b) undamaged apple (all types pooled). Transitions with $P \geq 0.10$ are indicated by solid lines, and those with $0.09 \geq P \geq 0.03$ are indicated with dashed lines. Values in parentheses indicate frequencies of each behaviour observed.