



INTERNATIONAL YEAR OF
GLASS
2022



11th International Symposium on
FRUIT FLIES
of Economic Importance

Fruit Flies of the World

Developed by Carol Quashie-Williams, MSc (Entomology), DIC, FRES, CSIRO STEM Professional in Schools, Assistant Director, Department of Agriculture, Fisheries and Forestry (DAFF).

Email: Carol.Quashie-Williams@agriculture.gov.au with any comments.

Fruit flies are one of the world's most destructive horticultural pests and pose a risk to most commercial fruit and vegetable crops. Globally, some fruit fly species attack up to 300 species of wild and domestic fruit and above ground vegetables.

These playing cards promote and raise awareness of the six main genera of fruit flies found around the world.

The card suits represent ♥ *Anastrepha & Rhagoletis*, ♠ *Ceratitidis*, ♦ *Bactrocera* and ♣ *Dacus & Zeugodacus*.

Teachers and students from Namadgi and Farrer Primary Schools in Canberra, Australia, worked with their *CSIRO STEM Professionals in Schools* DAFF partner and a DAFF graduate to develop these cards.

The cards include information such as body size (mm), number of countries and the number of host plants for each fruit fly.

The information was researched from a range of sources including CABI, pest fruit fly and Afrotropical fruit fly websites, delta-intkey.com, and images based on work by Georg Goergen, Taina Litwak and delta-intkey.

PS. 2022 is the International Year of Glass. Bristol (where I was born) is the home of BLUE glass, hence the colour for the card title, Carol.

Acknowledgements

This CSIRO STEM Professionals in Schools “*STAM*” (Science, Technology, *Arts* and Maths) project could not have been achieved without the following:

- The sketching skills of Ms Lara Alexandrow, Namadgi Primary School, DAFF staff Adam Herden, Graduate 2022 and Carol Quashie-Williams
- The commitment and fabulous artwork from Namadgi and Farrer Primary Schools students and teachers, Mrs Kathryn Glanville, Mrs Julie White and Ms Sue Taylor, Namadgi Primary School and Ms Kate Elliot, Farrer Primary School, in Canberra, Australia and
- The support of the staff of the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF), who helped to select the winning artwork.

Printing Instructions

Print single-sided on A4 paper or card 200-300 gsm for the front of the cards:

- Pages 4-5, ♥ *Anastrepha & Rhagoletis*
- Pages 6-7, ♠ *Ceratitis*
- Pages 8-9, ♦ *Bactrocera*
- Pages 10-11, ♣ *Dacus & Zeugodacus*.

Use page 12 to print the backs of the playing cards onto pages 5-12

Use page 13 to print the playing card box template

A***Rhagoletis pomonella***
Apple Maggot

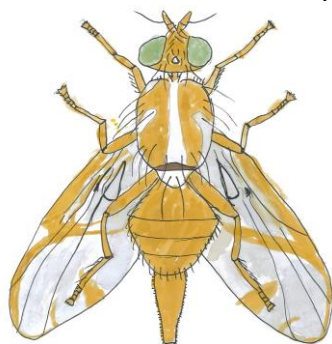
BODY SIZE (mm) 4.5

COUNTRIES 3

HOST PLANTS 58



Source: Max, Farrer Primary School

K***Anastrepha fraterculus***
South American fruit fly

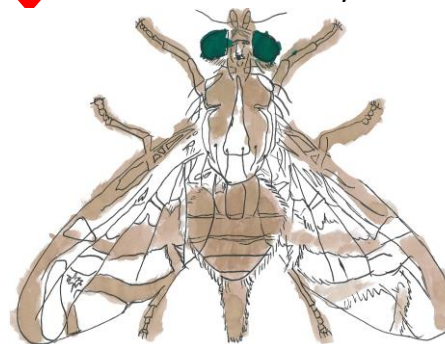
BODY SIZE (mm) 13.0

COUNTRIES 22

HOST PLANTS 141



Source: Caitlin, Namadgi Primary School

Q***Anastrepha obliqua***
West Indian fruit fly

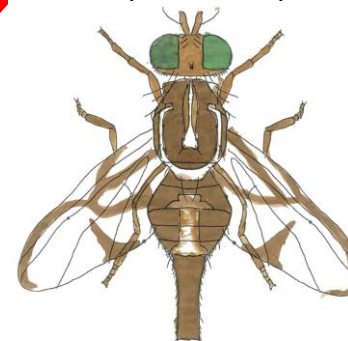
BODY SIZE (mm) 6.1

COUNTRIES 37

HOST PLANTS 81



Source: Thomas, Namadgi Primary School

J***Anastrepha serpentina***
Sapote fruit fly

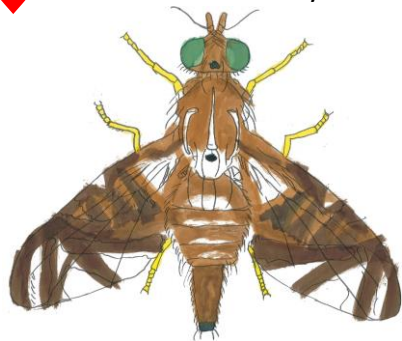
BODY SIZE (mm) 8.9

COUNTRIES 22

HOST PLANTS 61



Source: Joe, Namadgi Primary School

10***Anastrepha suspensa***
Caribbean fruit fly

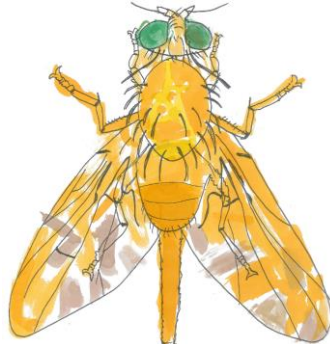
BODY SIZE (mm) 13.0

COUNTRIES 9

HOST PLANTS 61



Source: Ava, Namadgi Primary School

9***Anastrepha ludens***
Mexican fruit fly

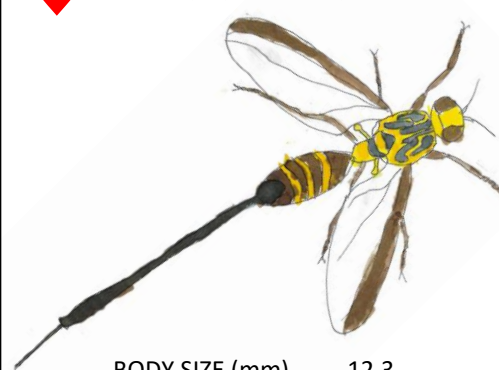
BODY SIZE (mm) 9.0

COUNTRIES 9

HOST PLANTS 51



Source: Chloe, Namadgi Primary School

8***Anastrepha curvicauda***
Papaya fruit fly

BODY SIZE (mm) 12.3

COUNTRIES 20

HOST PLANTS 4



Source: Ella, Namadgi Primary School

7***Anastrepha zeteki***
Fruit fly

BODY SIZE (mm) 8.5

COUNTRIES 1

HOST PLANTS 1



Source: Namadgi Primary School

6



Anastrepha zucchini

Fruit fly



BODY SIZE (mm) 8.7
COUNTRIES 1
HOST PLANTS ?



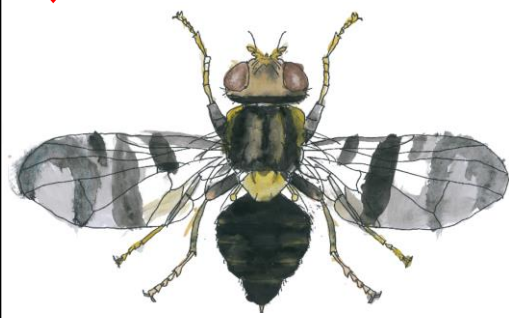
Source: John, Namadgi Primary School

5



Rhagoletis cerasi

European cherry fruit fly



BODY SIZE (mm) 3.4
COUNTRIES 44
HOST PLANTS 15



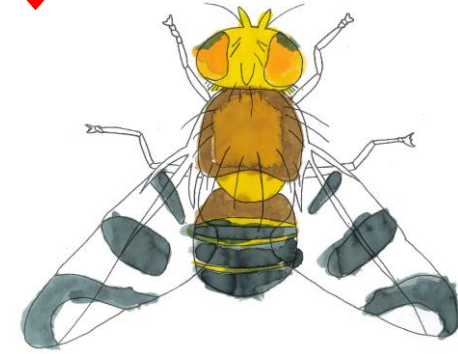
Source: Ellie, Farrer Primary School

4



Rhagoletis completa

Walnut husk fly



BODY SIZE (mm) 5.3
COUNTRIES 18
HOST PLANTS 12



Source: Annabelle, Namadgi Primary School

3



Rhagoletis fausta

Black cherry fruit fly



BODY SIZE (mm) 5.0
COUNTRIES 2
HOST PLANTS 7



Source: Ellie, Namadgi Primary School

2



Rhagoletis cingulata

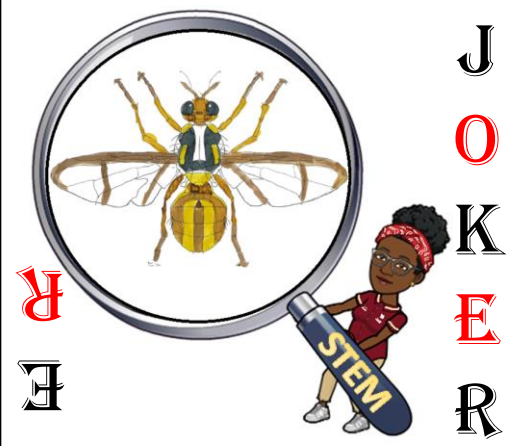
Cherry fruit fly



BODY SIZE (mm) 4.5
COUNTRIES 15
HOST PLANTS 6



Source: Sulaiman, Farrer Primary School



R
E
K
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J

J
O
K
E
R



Source: Carol Q-W & Maddison, Namadgi Primary School

A*Ceratitis rubivora*

Blackberry fruit fly



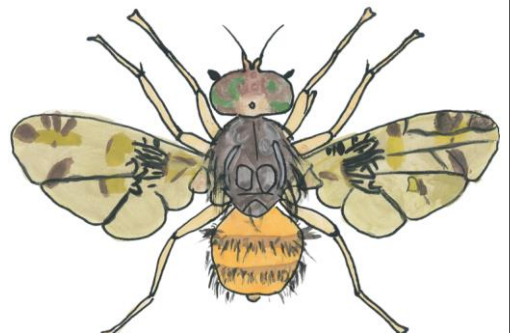
BODY SIZE (mm) 4.6
 COUNTRIES 4
 HOST PLANTS 12



Source: Jasper, Namadgi Primary School

K*Ceratitis capitata*

Mediterranean fruit fly



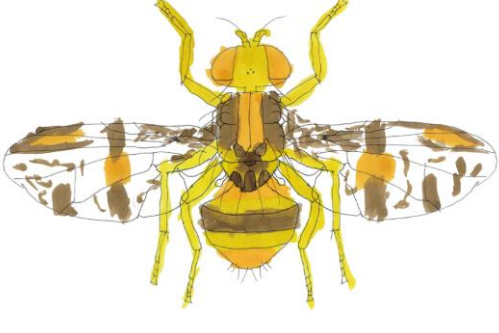
BODY SIZE (mm) 4.5
 COUNTRIES 101
 HOST PLANTS 342



Source: Kaylee, Farrer Primary School

Q*Ceratitis rosa*

Natal fruit fly



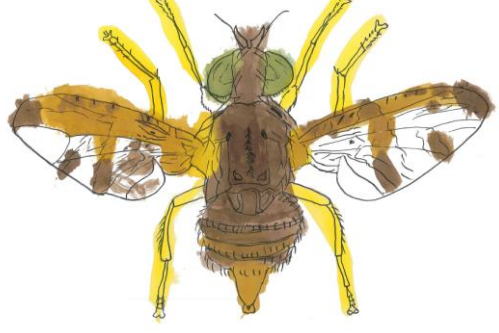
BODY SIZE (mm) 5.0
 COUNTRIES 9
 HOST PLANTS 149



Source: Jayrome, Namadgi Primary School

J*Ceratitis cosyra*

Mango fruit fly



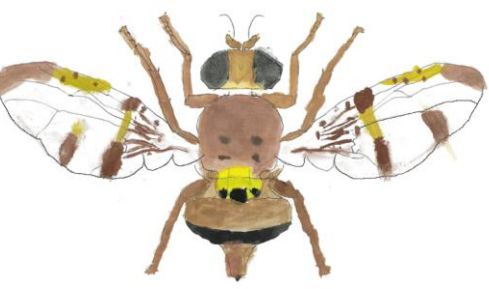
BODY SIZE (mm) 4.4
 COUNTRIES 28
 HOST PLANTS 67



Source: Viliami, Namadgi Primary School

10*Ceratitis fasciventris*

Fruit fly



BODY SIZE (mm) 4.5
 COUNTRIES 6
 HOST PLANTS 63



Source: Matilda, Farrer Primary School

9*Ceratitis anonae*

Annona fruit fly



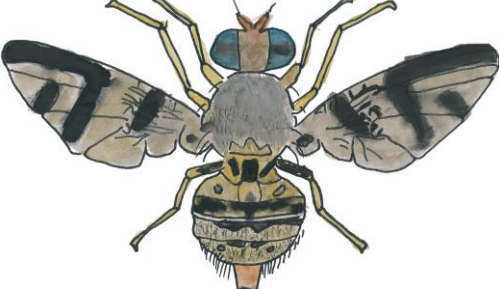
BODY SIZE (mm) 5.1
 COUNTRIES 6
 HOST PLANTS 62



Source: Sophia, Farrer Primary School

8*Ceratitis ditissima*

Fruit fly



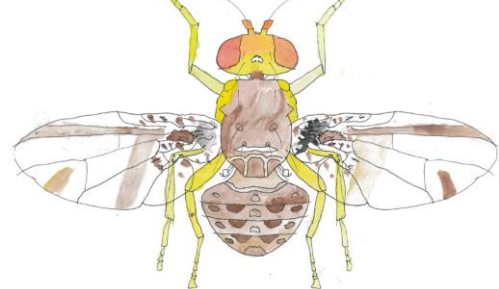
BODY SIZE (mm) 6.8
 COUNTRIES 2
 HOST PLANTS 15



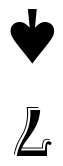
Source: Penny, Farrer Primary School

7*Ceratitis punctata*

Cacao fruit fly



BODY SIZE (mm) 6.9
 COUNTRIES 13
 HOST PLANTS 14

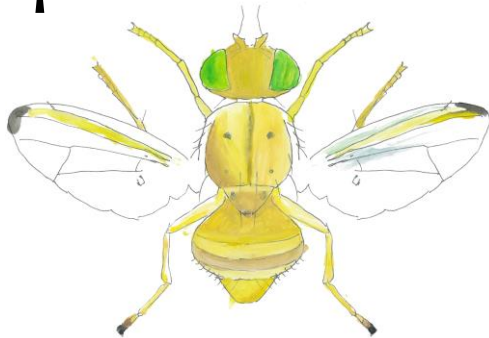


Source: Monique, Farrer Primary School

6

*Ceratitis
quinaria*

Five spotted fruit fly



BODY SIZE (mm) 4.2

COUNTRIES 6

HOST PLANTS 8



Source: Amira, Farrer Primary School

5

*Ceratitis
silvestrii*

Fruit fly



BODY SIZE (mm) 3.9

COUNTRIES 6

HOST PLANTS 6

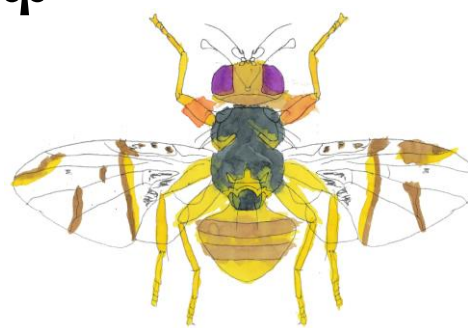


Source: Skylenea, Namadgi Primary School

4

*Ceratitis
catoirii*

Mascarene fruit fly



BODY SIZE (mm) 5.3

COUNTRIES 3

HOST PLANTS 6



Source: Laith Namadgi Primary School

3

*Ceratitis
connexa*

Fruit fly



BODY SIZE (mm) 7.4

COUNTRIES 5

HOST PLANTS 1

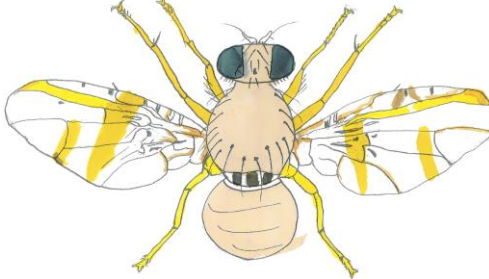


Source: Emma, Namadgi Primary School

2

*Ceratitis
bremii*

Fruit fly



BODY SIZE (mm) 5.9

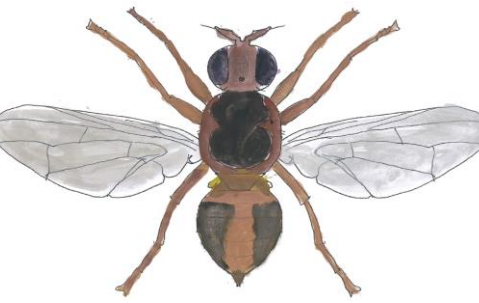
COUNTRIES 11

HOST PLANTS 4



Source: Leah, Namadgi Primary School

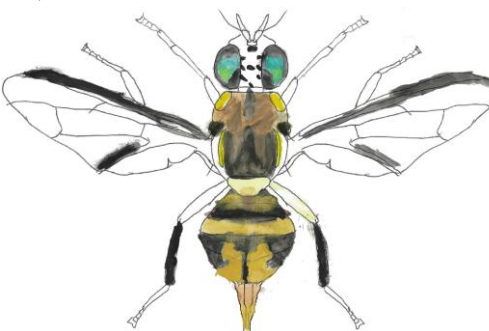
A *Bactrocera oleae*
Olive fruit fly



BODY SIZE (mm) 4.0
COUNTRIES 38
HOST PLANTS 1

Source: Emaan, Farrer Primary School


K *Bactrocera dorsalis*
Oriental fruit fly



BODY SIZE (mm) 8.0
COUNTRIES 75
HOST PLANTS 173

Source: Farrer Primary School

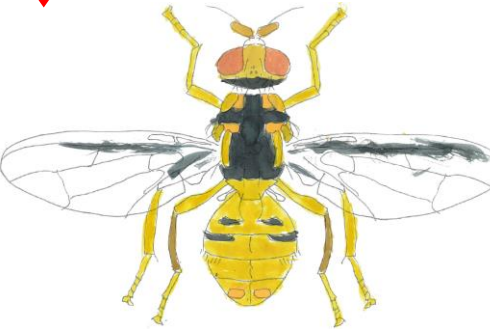
Q *Bactrocera tryoni*
Queensland fruit fly



BODY SIZE (mm) 6.0
COUNTRIES 4
HOST PLANTS 149

Source: Lillith, Namadgi Primary School


J *Bactrocera carambolae*
Carambola fruit fly



BODY SIZE (mm) 8.0
COUNTRIES 11
HOST PLANTS 75

Source: Sekona, Namadgi Primary School

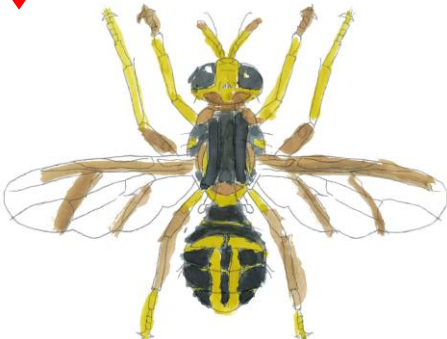
10 *Bactrocera passiflorae*
Fijian fruit fly



BODY SIZE (mm) 4.8
COUNTRIES 3
HOST PLANTS 49

Source: Frida, Namadgi Primary School


9 *Bactrocera frauenfeldi*
Mango fruit fly



BODY SIZE (mm) 6.0
COUNTRIES 11
HOST PLANTS 52

Source: Zoe, Namadgi Primary School

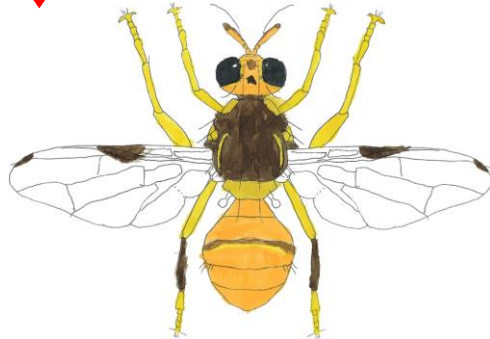
8 *Bactrocera melanotus*
Fruit fly



BODY SIZE (mm) 6.7
COUNTRIES 1
HOST PLANTS 31

Source: Nathaniel, Namadgi Primary School

7 *Bactrocera zonata*
Peach fruit fly



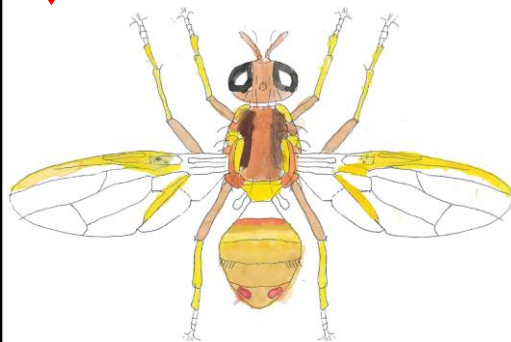
BODY SIZE (mm) 6.0
COUNTRIES 21
HOST PLANTS 20

Source: Namadgi Primary School

6

Bactrocera musae

Banana fruit fly



BODY SIZE (mm) 7.2

COUNTRIES 3

HOST PLANTS 7



9

Source: Sarah, Farrer Primary School

5

Bactrocera xanthodes

Pacific fruit fly



BODY SIZE (mm) 6.2

COUNTRIES 25

HOST PLANTS 10



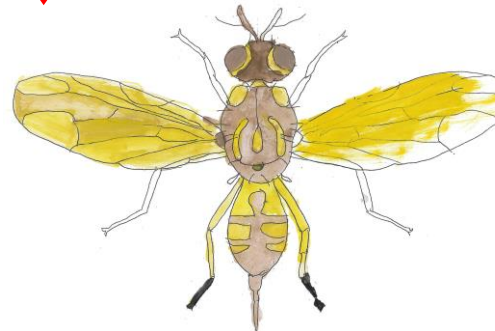
51

Source: Lucienne, Namadgi Primary School

4

Bactrocera tsuneonis

Japanese orange fruit fly



BODY SIZE (mm) 6.8

COUNTRIES 3

HOST PLANTS 9



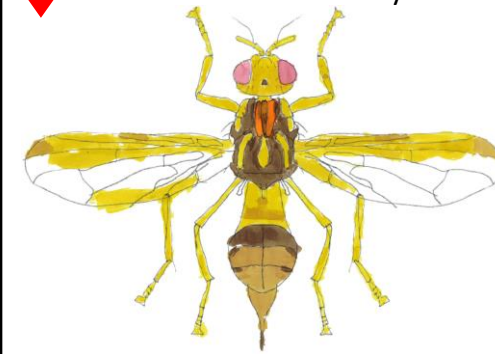
17

Source: Nora, Namadgi Primary School

3

Bactrocera minax

Chinese citrus fruit fly



BODY SIZE (mm) 8.5

COUNTRIES 4

HOST PLANTS 10



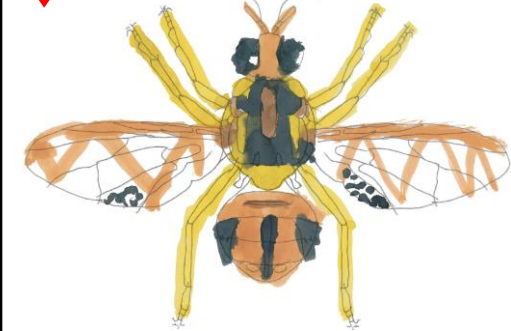
8

Source: Fatima, Namadgi Primary School

2

Bactrocera umbrosa

Breadfruit fly



BODY SIZE (mm) 8.0

COUNTRIES 9

HOST PLANTS 4

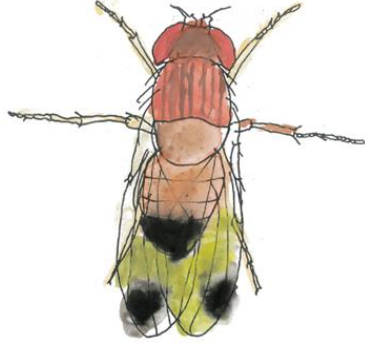


7

Source: Ari, Namadgi Primary School

A*Drosophila
suzukii*

♣ Spotted wing drosophila

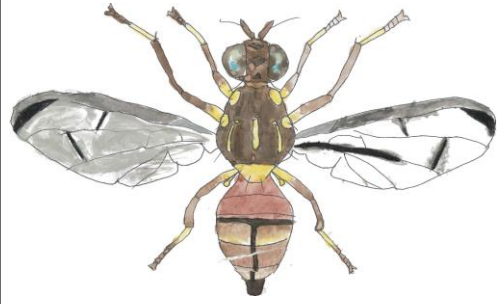


BODY SIZE (mm)	3.0	♣
COUNTRIES	55	♣
HOST PLANTS	140	W

Source: Micah, Farrer Primary School

K*Zeugodacus
cucurbitae*

♣ Melon fly

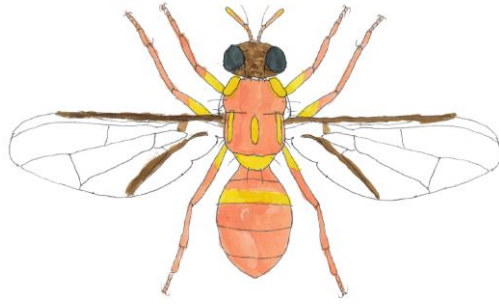


BODY SIZE (mm)	8.0	♣
COUNTRIES	60	♣
HOST PLANTS	101	Y

Source: Zali, Farrer Primary School

Q*Zeugodacus
cucumis*

♣ Cucumber fruit fly

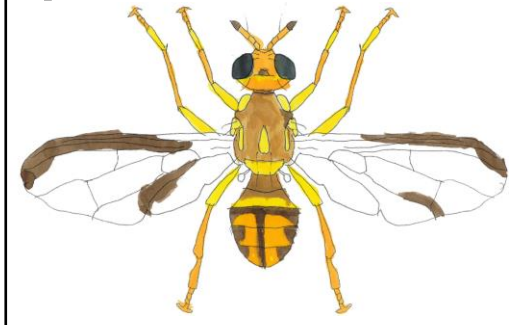


BODY SIZE (mm)	5.8	♣
COUNTRIES	1	♣
HOST PLANTS	40	0

Source: Tanaz, Namadgi Primary School

J*Zeugodacus
tau*

♣ Fruit fly

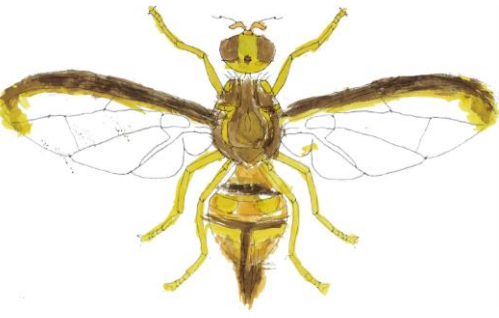


BODY SIZE (mm)	7.7	♣
COUNTRIES	16	♣
HOST PLANTS	34	P

Source: Lielle, Namadgi Primary School

10*Zeugodacus
depressus*

♣ Pumpkin fruit fly

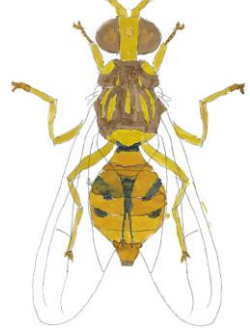


BODY SIZE (mm)	9.2	♣
COUNTRIES	3	♣
HOST PLANTS	9	OL

Source: Zaynab, Namadgi Primary School

9*Zeugodacus
choristus*

♣ Fruit fly



BODY SIZE (mm)	8.4	♣
COUNTRIES	2	♣
HOST PLANTS	1	6

Source: Emilia, Namadgi Primary School

8*Zeugodacus
decepiens*

♣ Pumpkin fruit fly

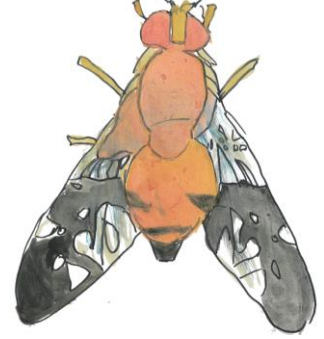


BODY SIZE (mm)	9.2	♣
COUNTRIES	1	♣
HOST PLANTS	1	8

Source: Aarush, Namadgi Primary School

7*Dirioxa
pornia*

♣ Island fly



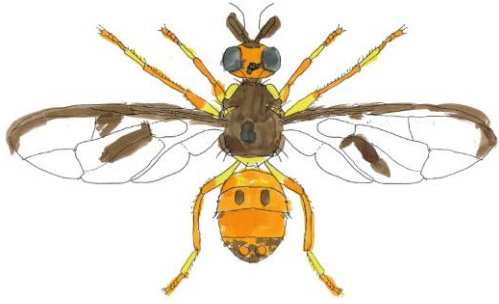
BODY SIZE (mm)	7.0	♣
COUNTRIES	2	♣
HOST PLANTS	83	L

Source: Daisy, Namadgi Primary School

6

Dacus ciliatus

Lesser pumpkin fly



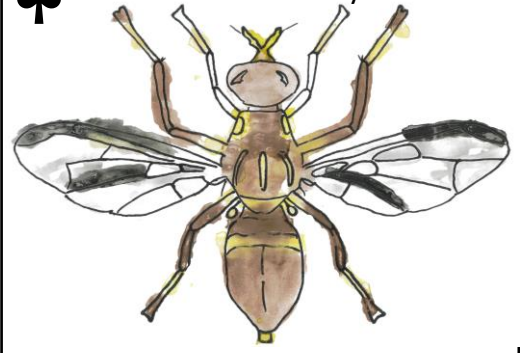
BODY SIZE (mm)	6.5	♣
COUNTRIES	61	♣
HOST PLANTS	37	9

Source: Sarah, Namadgi Primary School

5

Dacus punctatifrons

Tomato fruit fly



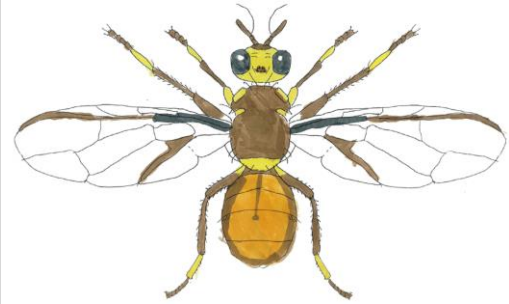
BODY SIZE (mm)	8.5	♣
COUNTRIES	33	♣
HOST PLANTS	19	5

Source: Mikey, Farrer Primary School

4

Dacus vertebratus

Jointed pumpkin fly



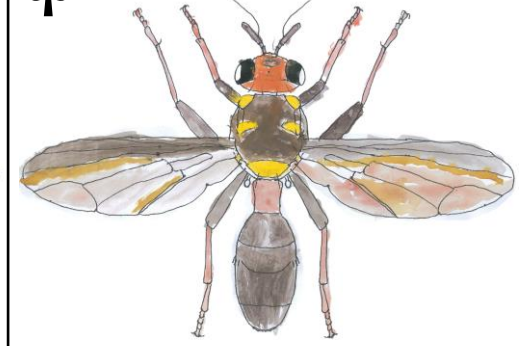
BODY SIZE (mm)	8.0	♣
COUNTRIES	34	♣
HOST PLANTS	13	7

Source: Ainslie, Namadgi Primary School

3

Dacus solomonensis

Solomon fly



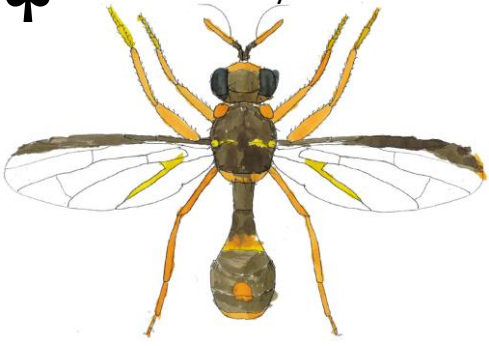
BODY SIZE (mm)	12.0	♣
COUNTRIES	2	♣
HOST PLANTS	5	3

Source: Minna, Farrer Primary School

2

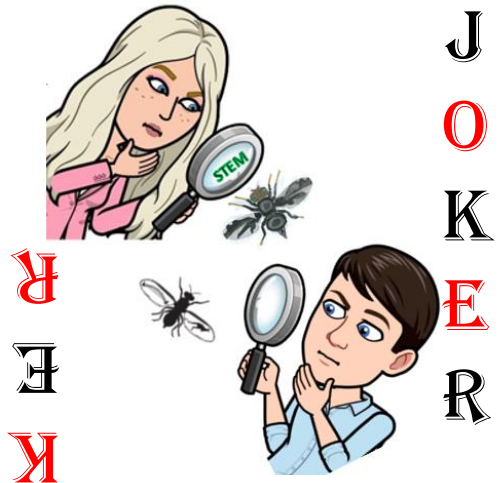
Dacus longicornis

Fruit fly



BODY SIZE (mm)	8.6	♣
COUNTRIES	12	♣
HOST PLANTS	4	2

Source: Roy, Namadgi Primary School



J
O
K
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R

R
E
K
O
J

Source: Maddii & Adam, DAFF; Maddy, Farrer Primary School & 11th ISFFEI



**Fruit Flies
of the
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Adapted from:

<https://www.template.net/design-templates/box-templates/playing-card-box-template/>

Shallower box

Fruit Flies of the World



**Fruit Flies
of the World**

Fruit Flies of the World

Fruit flies are one of the world's most destructive horticultural pests and pose a risk to most commercial fruit and vegetable crops. Globally, some fruit fly species attack up to 300 species of wild and domestic fruit and above ground vegetables.

These playing cards promote and raise awareness of the six main genera of fruit flies found around the world.

The card suits represent ♥ *Anastrepha & Rhagoletis*, ♦ *Ceratitis*, ♦ *Bactrocera* and ♠ *Dacus & Zeugodacus*.

Teachers and students from Namadgi and Farrer Primary Schools in Canberra, Australia, worked with their DAFF supported CSIRO STEM (Science, Technology, Engineering and Mathematics) Professionals in Schools partner and a DAFF graduate to develop these cards. The cards include fruit fly information such as body length (mm), number of countries and the number of host plants for each fruit fly. The information was researched from a range of sources including CABI, pest fruit fly and Afrotropical fruit fly websites, delta-intkey.com, and images based on work by Georg Goergen and Taina Litwak.

INSTRUCTIONS – FRUIT FLY GAME 2-6 Players.

Shuffle and deal out all the cards, including the Jokers, face down to each player. Players turn over their top card. The dealer starts by reading out the name of the fruit fly, then selects a category of BODY SIZE (mm), COUNTRIES or HOST PLANTS and reads out the number for the category. Each player reads out their number for the chosen category. All cards are placed on the table. The winner of the hand is the player with the highest number OR the player with a Joker card (the Joker 'trumps' or beats the highest number). If two or more cards have the same category number, all the cards are left on the table. Players turn over the next top card and a new category is chosen by the same person as in the previous round. The winner then collects all the cards on the table and places them face up on the table. The player to the left of the dealer then turns over their top card and selects a category. Each player has a turn to select a category. The winner of the game is the player with the most cards.

<https://www.agriculture.gov.au/biosecurity-trade/pests-diseases-weeds/fruit-flies-australia>

INSTRUCTIONS

Fruit Flies of the World Game

For 2-6 Players

- Shuffle and deal out all the cards, including the Jokers, face down to each player.
- Players turn over their top card. The dealer starts by reading out the name of the fruit fly, then selects a category of BODY SIZE (mm), COUNTRIES or HOST PLANTS and reads out the number for the category.
- Each player reads out their number for the chosen category. All cards are placed on the table.
- The winner of the hand is the player with the highest number OR the player with a Joker card (the Joker 'trumps' or beats the highest number). The winner collects all the cards on the table.
- If two or more cards have the same category number, all the cards are left on the table. Players turn over the next top card and a new category is chosen by the same person as in the previous round. The winner then collects all the cards on the table and places them face up on the table.
- The player to the left of the dealer then turns over their top card and selects a category. Each player has a turn to select a category.
- The winner of the game is the player with the most cards.

REFERENCES INCLUDE:

- https://fruitflykeys.africamuseum.be/en/pdf_keys.html images
- <https://www.fruitflyidentification.org.au/lookup-species/>
- <https://www.planthealthaustralia.com.au/national-programs/fruit-fly/handbook-for-the-identification-of-fruit-fly/> (handbook)
- <https://www.cabi.org/isc/datasheet/47057> Datasheet *Rhagoletis mendax* (blueberry fruit fly)
- <https://www.standardsfacility.org/PG-567> Fruit Fly Free: Pest-free and Low Prevalence Areas to Support Fruit Production and Exports
- <http://www.arc.agric.za/arc-ppri/F3-Fruit-fly-free/Pages/default.aspx>
- <https://www.delta-intkey.com/ffa/index.htm> Info