

# Fruit fly molecular diagnostics

## RFLP PCR RESTRICTION PATTERNS

(adapted from Armstrong and Cameron, 1988)

The restriction patterns are summarised in the following photographs. Aim to use four enzymes to identify unknown specimens. At least one example of each species is presented; see the Fruit Fly Identification Australia website ([www.fruitflyidentification.org.au](http://www.fruitflyidentification.org.au)) for species names in full.

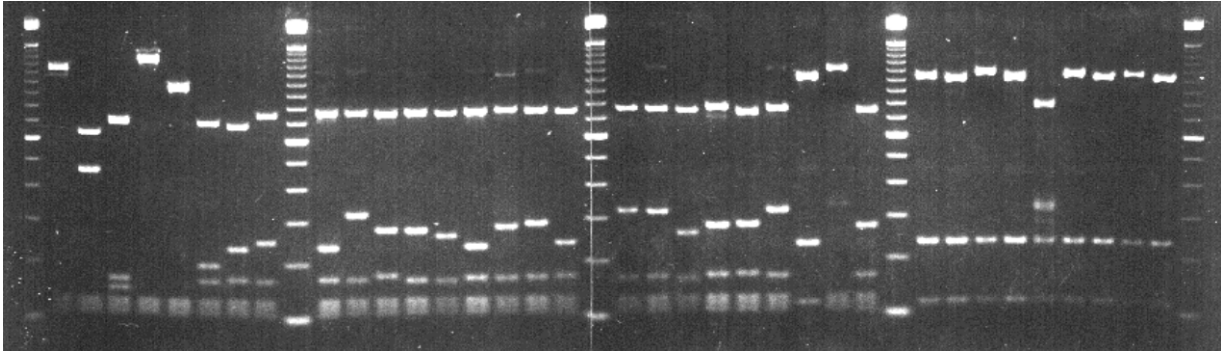
The tables of fragments provide only approximate sizes (bp) based on the limitations of estimating from electrophoresis gels. However, comparative estimations are still diagnostic.

**mw**, molecular weight marker (100bp ladder, Gibco BRL) where highlighted bands indicate 2000 bp (top), 600 bp (middle) and 100 bp (bottom).

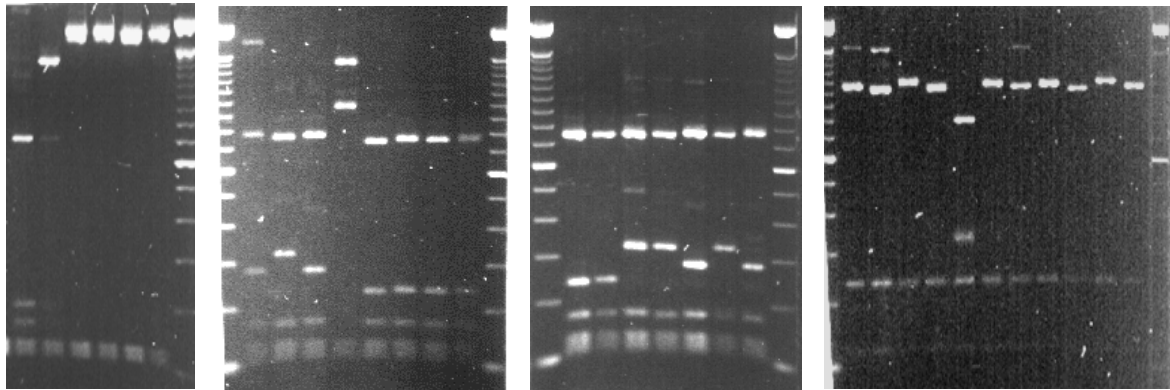
Note: *B. correcta* not included in the report or elsewhere in that Manual.

### ALU1 (AG/CT)

D1 F E D3 D2 C7 C6 C4 C3 C5 C1 C1 C2 C3 C1 C1 C3 C5 C5 C2 C1 C1 C5 A1 D1 C1 A1 A1 A2 A1 B A2 A1 A2 A1  
 Rp Rc Ds Cc Bcb Bx Bo Bu Bt Btl Bq Bpd Bp Bn Bmu Bm Bl Bk Bfr Bf Bd Bcp Bcm Az Bc Bj Az Asp As tAso As Ao Al Ag Af



mw mw mw mw mw  
 D1 D3 D4 C1 C5 C1 D2 C3 C3 C3 C3 C3 C3 C5 C5 C1 C5 C1 A1 A1 A2 A1 B A2 A1 A2 A1 A2 A2  
 Rp Cc \_\_\_Cr\_\_\_ Bpy Bcm Bd Bcb Btr Bt Bn Ba Btr Bl Bcr Bcm Bd Bz1 Bz2 Az Asp Ast AsoAsAo Al Ag AfAb2Ab1



mw mw mw mw mw mw mw

#### HAPLOTYPE

#### FRAGMENT SIZES (BP)

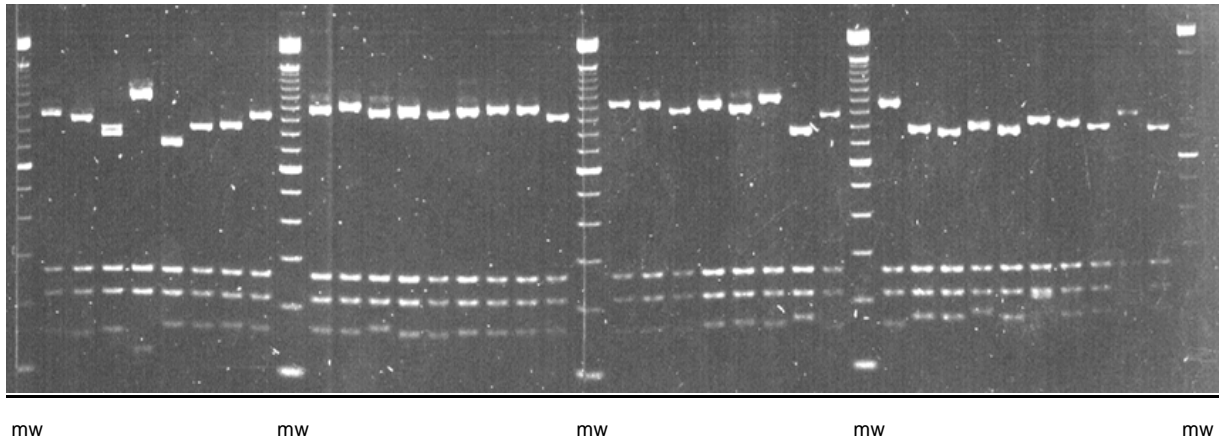
A1	1080-1050			240			120	
A2	1150-1100			240			120	
B	800-790*		340-330	240			120	
C1		790-770		290-280	180-170		130	120
C2		770-760		270	170		130	120
C3		780-770		240-230*	170		130	120
C4		770		250	170		130	120
C5		780-760	330-310		170		130	120
C6			680	240	170		130	120
C7			700-660*	200	170		130	120
D1	1200-1180						130	120
D2		980					130	120
D3	1300						130	120
D4	1700						130	120
E			720-700*		170 150		130	120
F			640 450				130	120

\*Sometimes double band

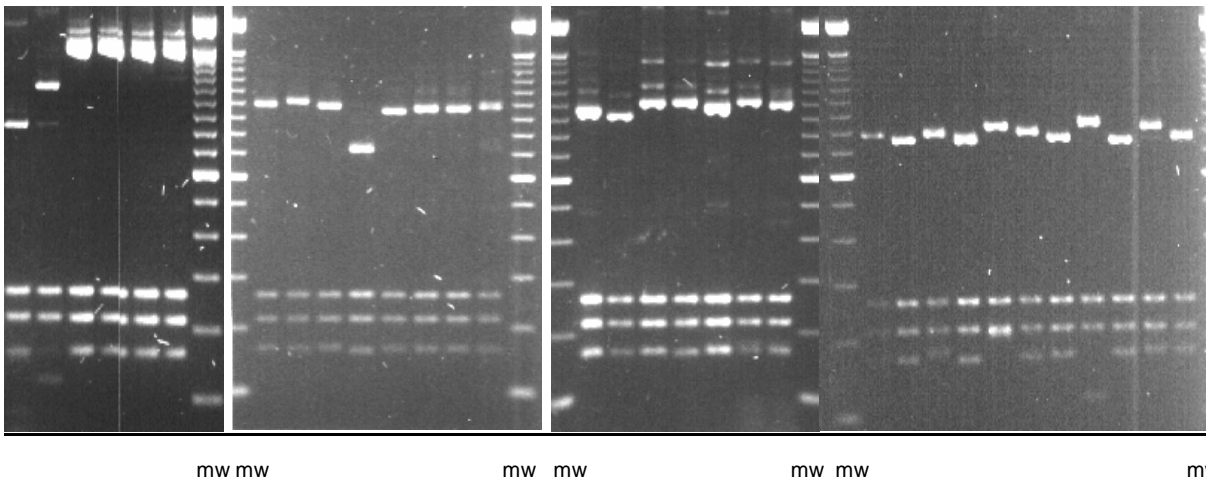


### DDEI (C/TNAG)

A4 A3 A1 D A1 A2 A2 A4    A5 A6 A5 A5 A4 A5 A5 A5 A4    A6 A6 A4 A5 A5 A6 A1 A3    A5 A1 A1 A1 A1 C A1 A1 B A1  
 Rp Rc Ds Cc Bcb Bx Bo Bu    Bt Btl Bq Bpd Bp BnBmuBm Bl    Bk Bfr Bf Bd Bcp Bcm Az Bc    Bj Az AspAstAsoAs Ao Al Ag Af



A4 D E    A5 A6 A5 A1 A5 A5 A5 A5    A5 A4 A6<sup>9</sup> A6 A5 A6 A5    A1 A1 A1 A1 C A1 A1 B A1 A2 A1  
 Rp Cc \_\_\_Cr\_\_\_    Bpy Bcm Bd Bcb Btr Bt Bn Ba    Btr Bl Bcr Bcm Bd Bz1 Bz2    Az Asp Ast Aso As Ao Al Ag Af Ab2 Ab1



#### HAPLOTYPE

#### FRAGMENT SIZE (BP)

HAPLOTYPE	FRAGMENT SIZE (BP)
A1	800-750 270 220 180-160
A2	860-830 270 220 170
A3	900 270 220 160-150
A4	950-930 270 220 160
A5	1000-980* 270 220 170-160
A6	1030 270 220 170-160
B	850 270 220 120
C	830-800* 270 220 210
D	1150 270 220 130
E	1500 270 220 170

\* Sometimes double band

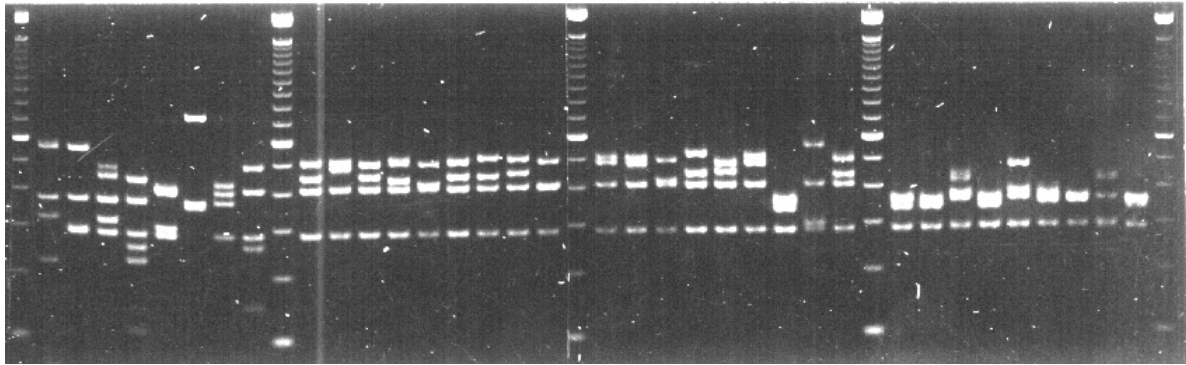




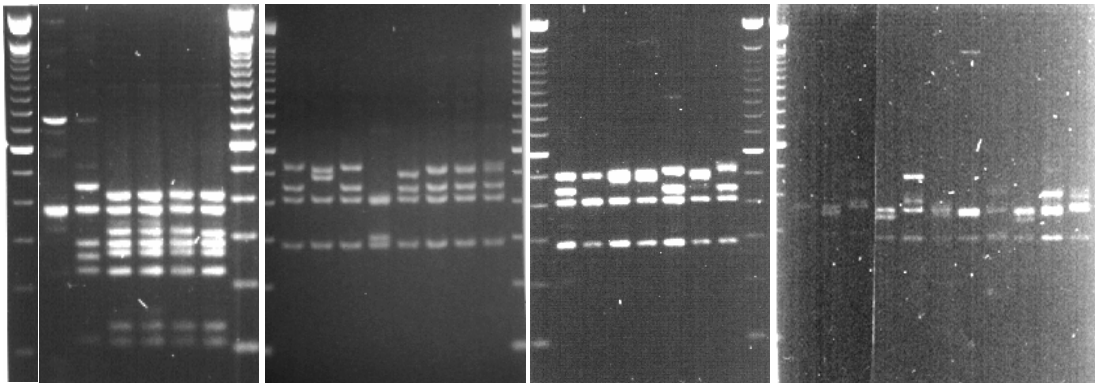


### RSAI (GT/AC)

M F2 L K J I B5 G C1 D C1 C1 E1 C1 C1 C1 E2 D D E1 C1 C2 D A F1 C1 A A B3 A B2 A A B1 A  
 Rp Rc Ds Cc Bcb Bx Bo Bu Bt Btl Bq Bpd Bp Bn Bmu Bm Bl Bk Bfr Bf Bd Bcp Bcm Az Bc Bj Az Asp Ast Aso As Ao Al Ag Af



mw mw mw mw mw  
 I K N C1 D C1 J C1 C1 C1 C1 C1 E2 D<sup>o</sup> D C1 D C1 A A B3 A B2 A A B1 A B4 B4  
 Bx Cc \_\_\_Cr\_\_\_ B<sub>py</sub>B<sub>cm</sub> Bd B<sub>cb</sub> Btr Bt Bn Ba Btr Bl B<sub>cr</sub> B<sub>cm</sub> Bd Bz<sub>1</sub> Bz<sub>2</sub> Az A<sub>sp</sub> A<sub>st</sub> A<sub>so</sub> As Ao Al Ag Af Ab<sub>2</sub> Ab<sub>1</sub>



mw mw mw mw mw mw

#### HAPLOTYE

#### FRAGMENT SIZE

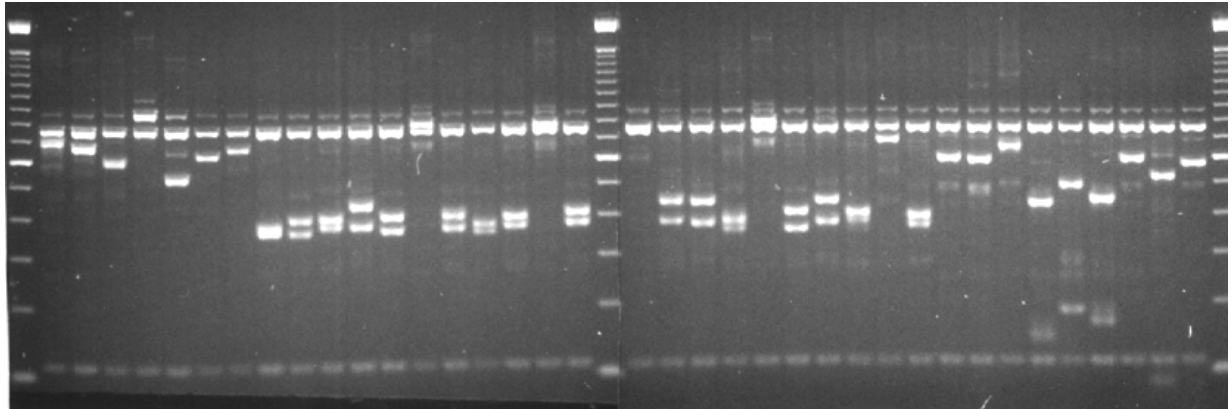
A				380-340 <sup>Δ</sup>	290
B1			440 430	360	290
B2		480		380 370	290
B3		480-450		(370-360)x2	290
B4				410 380 370	290
B5			430	400 370	290
C1	530-500*		460-440*	410	290
C2		490	460	410	290
D	520-500	490		410	290
E1	500			420 410	290
E2	500			(410)x2	290
F1	570			410	300 290
F2	570			380	300 290
G	510-500*		410		290 260 150
I	750			370 360	
J			410 400	310	290
K			450	380	290 260 240 110
L			450	380	320 290
M	580			380	330 230

<sup>Δ</sup> Several patterns, combinations of 3 bands; \* sometimes double band



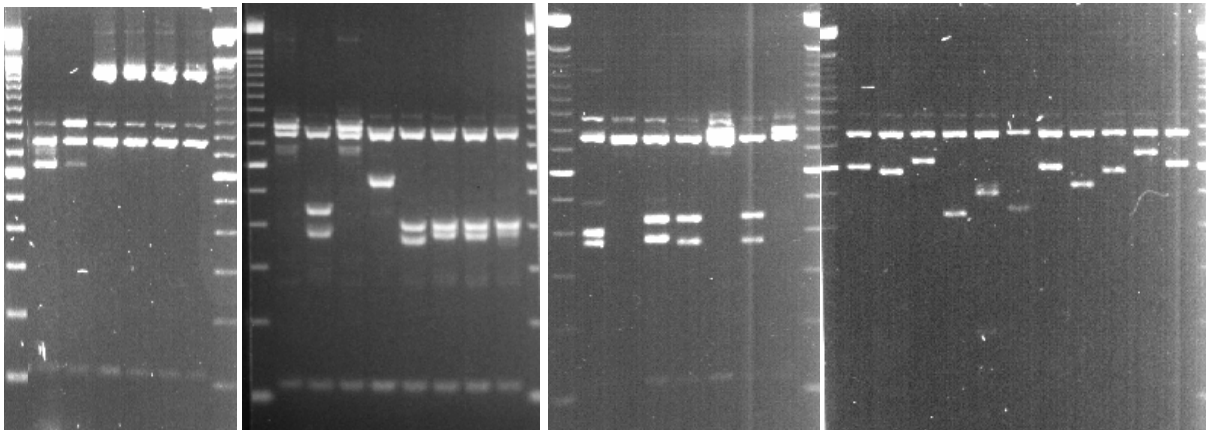
### SAU3A (I/GATC)

A3 A2 A1 E2 A4 A1 A2 D2 D1 D1 D3 D1 E1 D1 D2 D1 E1 D1 F D3 D3 D2 E1 D1 D3 D1 A3 D1 A1 A1 A2 C3 C2 C1 A1 B A1  
 Rp Rc Ds Cc Bcb Bx Bo Bu Btr Bt Btl Bq Bpy Bpd Bp Bn Bmu Bm Bl Bk Bfr Bf Bd Bcp Bcm Ba Bc Bj Az Asp Ast Aso As Ao Al Ag Af



mw mw mw

A3 E2 G E1 D3 E1 A4 D1 D1 D1 D1 D1 D1 F D3<sup>φ</sup> D3 E1 D3 E1 A1 A1 A2 C3 C2 C1 A1 B<sup>ψ</sup> A1 A2 A1  
 Rp Cc Cr Bpy Bcm Bd Bcb Btr Bt Bn Ba Btr Bl Bcr Bcm Bd Bz1 Bz2 Az Asp Ast Aso As Ao Al Ag Af Ab2 Ab1



mw mw mw mw mw mw

#### HAPLOTYPE

#### FRAGMENT SIZE

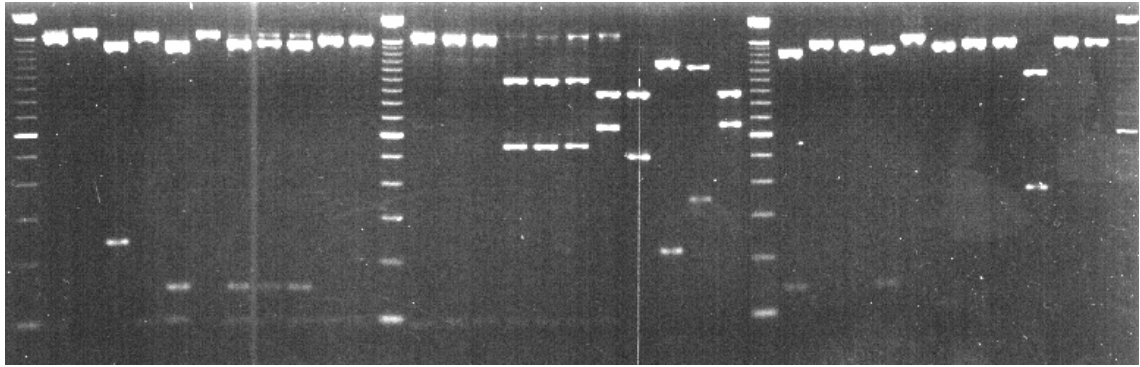
A1	770	620-580*	110
A2	770	670-660*	110
A3	770 700		110
A4	770	530	110
B	770	530	110 80
C1	770	450	200-170 110
C2	770	520/500/480/400**	200-190 110
C3	770	440	140-130 110
D1	770	410-400 390-360*	110
D2	770	380 360	110
D3	770	450-440* 380-370	110
E1	800 770		110
E2	880 770		110
F	760 730		110

<sup>ψ</sup> Diagnostic 80 bp and 100 bp bands not visible here, see photograph above; \* sometimes double band.

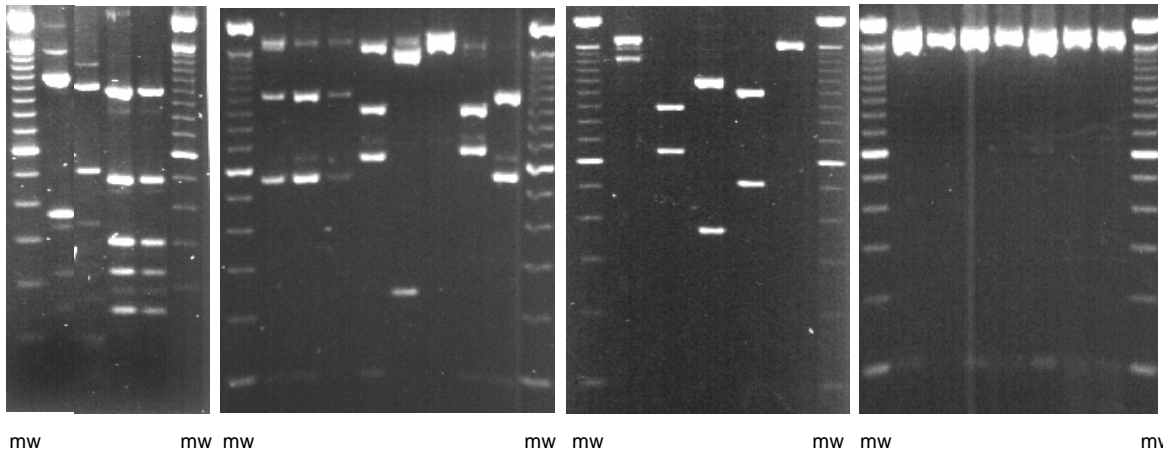
\*\* any combination of two bands

### SSPI (AAT/ATT)

D3 A2 I D3 HA2 H H H D3 D3 D3 D3 G1 G1 G1 E F3 C B3 F1 D2 A1 A1 D2 A2 D1 A1 A1 B1 A1 A1  
 Btr Bq Bpd BmuBm Bl Btl Bk Br Bp Bf Bcm Bpy Bd Bt Bn Ba Bj Bcb Bx Bo Bc Ab Az Aso Ast As Ao Asp Al Ag Af Af



mw mw mw mw  
 B2 G2 J J G1 G1 G1 D3 I A2 E G3 I F2 B2 G2 D3 D3 A2 D3<sup>Φ</sup> D3 D3 D3 D3  
 Ds Cc Cr Cr Bt Bn Ba Bp Bpd Bq Bj Bcp Rp Rc Ds Cc Bu Btr Bl Bcr Bcm Bd Bz<sub>1</sub> Bz<sub>2</sub>



#### HAPLOTYPE

#### FRAGMENT SIZE

A1	1500 (uncut)				
A2	1700 (uncut)				
B1		1050		370	(60)*
B2		1100		380	
B3		1150		350	
C		1200			210 80
D1		1400			110
D2		1350-1300			150-140
D3		1650-1600			100
E			880 640		100
F1			880 650		
F2			900 640		
F3			880	500	
G1			1000	550	100
G2			1020	520	100
G3			1020	580	100
H		1450			150 100
I		1350			250

\*Fragment not always visible