APPENDIX I

Breeding Arowana in Captive Environment

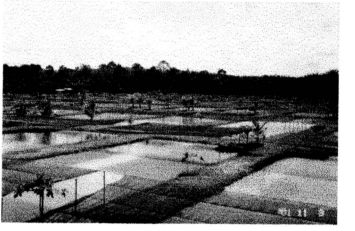


Fig.1 A CITES arowana farm

Fig.2 Farm workers were harvesting brooding males in an earth pond

Fig.3 Brooding males were harvested

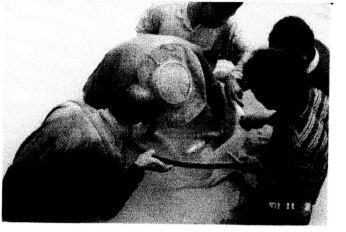


Fig.4 The mouth of a brooding male was opened

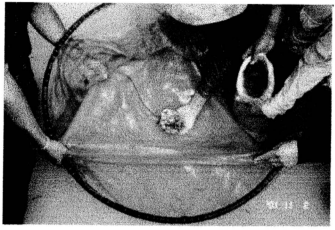


Fig.5 Fries were collected

Fig.6 Fries were put in a plastic bag

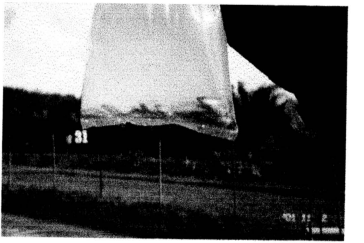


Fig. 7 Fries collected in plastic bag were brought to the nursery

APPENDIX 2

Arowana Varieties

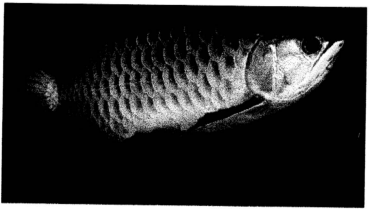


Fig. 1 Malaysian gold arowana

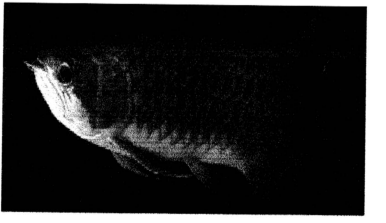


Fig. 2 Indonesian red arowana

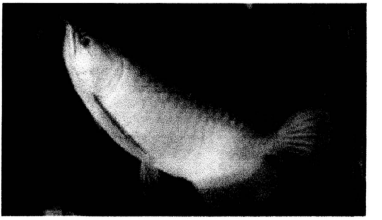


Fig. 3 Green arowana

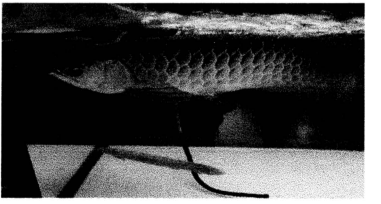


Fig. 4 Indonesian red-tail gold arowana

APPENDIX 3
Methodological Outlines

Allele frequency = sum of an allele at a locus ÷ the total number of alleles for the locus

in the population.

Observed heterozygosity: Ho = ho/(N x r)

where ho = total number of heterozygous individuals observed

N = number of stocks and r = number of loci studied

Expected heterozygosity: $H_e = 1 - \sum_{i=1}^{n}(q_i)^2$ for n alleles

where q_i = frequency of the ith allele of n alleles at a locus

Inbreeding coefficient: $F_{IS} = \frac{H_S - H_I}{H_S}$

where H_S = expected heterozygosities in subpopulations

H_I = observed heterozygosities in individuals in subpopulations

Genetic differentiation $F_{ST} = \frac{H_T - H_S}{H_S}$

where H_T = expected heterozygosities for overall total population

H_S = expected heterozygosities in subpopulations

Population genetics structure inferred by analysis of molecular variance (AMOVA)

Source of variation	Degrees of freedon	Sum of squares (SSD)	Expected mean squares
Among Populations	$P - 1$	SSD(AP)	$n\sigma^{2}_{a} + \sigma^{2}_{b}$
Within Populations	$N - P$	SSD(WP)	σ^{2}_{b}
Total	$N - 1$	SSD(T)	σ^{2}_{T}

Where n and FST are defined by

$$n = \frac{N - \frac{\sum N_P^2}{N}}{P - 1}$$

$$FST = \frac{\sigma^2_a}{\sigma^2_T}$$

APPENDIX 4

Pnynotypes of Seven Strains of Arowana at Twenty-one Loci

Locus / Strain	No of Individual	Phynotyes														
D01		195/195	195/210	195/220	195/230	210/210	210/220	210/230	210/240	210/260	220/240	00/00				
Wild Green	6	0	0	0	5	0	1	0	0	0	0	0				
Farm Green	14	0	0	0	2	0	6	0	1	5	5	0				
Malaysian Red-tail Gold	22	3	8	5	3	0	0	0	0	0	0	3				
Red	15	5	6	0	0	0	0	0	0	3	3	0				
Wild Malaysian Yellow-tail Gold	7	1	1	2	0	1	1	0	0	0	0	1				
Farm Malaysian Yellow-tail Gold	16	2	1	11	0	0	2	0	0	0	0	0				
Indonesian Gold	11	3	0	0	2	0	0	6	0	0	0	0				

D04		170/170	170/230	180/180	180/210	180/230	190/210	190/230	190/240	190/250	210/230	210/240	230/230	240/240	240/250	00/00
Wild Green	6	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0
Farm Green	14	0	3	0	0	4	0	0	0	0	4	0	2	0	0	1
Malaysian Red-tail Gold	22	1	0	0	0	1	0	11	1	0	0	1	0	0	0	0
Red	15	0	0	13	0	0	0	0	1	0	0	0	0	0	1	0
Wild Malaysian Yellow-tail Gold	7	0	0	0	0	0	5	0	0	0	1	0	0	1	0	0
Farm Malaysian Yellow-tail Gold	16	0	0	0	0	0	8	0	1	0	3	0	0	4	0	0
Indonesian Gold	11	0	0	0	0	0	0	4	0	1	2	0	0	4	0	0
D11		150/155	150/160	155/190	160/160	160/165	160/190	165/190	00/00							
Wild Green	6	0	0	0	6	0	0	0	0							
Farm Green	14	0	0	4	1	1	8	0	0							
Malaysian Red-tail Gold	22	0	1	0	3	9	1	1	7							
Red	15	0	0	0	9	0	6	0	0							

Wild Malaysian Yellow-tail Gold	7	0	0	0	7	0	0	0	0							
Farm Malaysian Yellow-tail Gold	16	0	6	0	7	1	2	0	0							
Indonesian Gold	11	3	1	0	5	0	2	0	0							
D13		95/95	95/105	100/100	100/120	105/105	105/120	120/120	140/140	00/00						
Wild Green	6	0	0	0	0	6	0	0	0	0						
Farm Green	14	0	0	0	0	14	0	0	0	0						
Malaysian Red-tail Gold	22	0	5	0	7	5	1	3	0	1						
Red	15	3	0	0	0	3	0	9	0	0						
Wild Malaysian Yellow-tail Gold	7	0	0	1	0	0	0	6	0	0						
Farm Malaysian Yellow-tail Gold	16	0	0	11	0	0	0	4	1	0						
Indonesian Gold	11	0	0	0	0	0	3	6	2	0						
D14		200/250	200/260	210/215	210/240	215/215	215/220	215/240	220/220	220/250	240/240	240/250	240/260			

Wild Green	6	0	0	0	0	0	0	0	0	6	0	0	0				
Farm Green	14	0	0	0	0	0	0	0	0	11	0	3	0				
Malaysian Red-tail Gold	22	0	0	0	0	12	0	0	4	0	0	0	6				
Red	15	1	1	0	3	0	0	0	1	0	9	0	0				
Wild Malaysian Yellow-tail Gold	7	0	0	0	0	0	0	0	3	0	0	4	0				
Farm Malaysian Yellow-tail Gold	16	0	0	0	0	0	0	0	6	0	0	10	0				
Indonesian Gold	11	0	1	2	0	0	1	3	0	0	5	0	0				
D15		195/195	195/210	195/220	200/200	200/220	210/210	210/235	220/220	00/00							
Wild Green	6	0	5	0	0	0	0	0	0	1							
Farm Green	14	0	4	0	8	0	0	0	0	2							
Malaysian Red-tail Gold	22	9	0	1	0	0	0	2	4	6							
Red	15	0	0	0	0	0	4	0	10	1							

Wild Malaysian Yellow-tail Gold	7	0	0	0	0	3	0	0	4	0							
Farm Malaysian Yellow-tail Gold	16	0	0	0	0	13	0	0	2	1							
Indonesian Gold	11	4	0	0	6	0	0	1	0	0							
D16		130/130	140/140	140/150	150/160	00/00											
Wild Green	6	0	6	0	0	0											
Farm Green	14	0	9	5	0	0											
Malaysian Red-tail Gold	22	0	12	8	0	2											
Red	15	7	7	0	0	0											
Wild Malaysian Yellow-tail Gold	7	0	3	4	0	0											
Farm Malaysian Yellow-tail Gold	16	0	9	5	0	1											
Indonesian Gold	11	0	7	3	1	0											

D27		95/125	100/100	100/125	115/115	115/125	115/130	115/135	120/120	120/130	00/00					
Wild Green	6	0	0	0	4	0	0	0	0	0	2					
Farm Green	14	0	0	0	8	0	2	1	2	1	0					
Malaysian Red-tail Gold	22	0	0	1	18	1	2	0	0	0	0					
Red	15	0	0	6	1	3	0	0	2	1	3					
Wild Malaysian Yellow-tail Gold	7	1	0	0	3	0	4	0	0	0	0					
Farm Malaysian Yellow-tail Gold	16	0	0	0	9	0	3	0	0	0	0					
Indonesian Gold	11	0	0	2	8	1	0	0	0	0	0					
D31		220/220	220/225	220/240	225/225	225/240	245/245	00/00								
Wild Green	6	4	0	2	0	0	0	0								
Farm Green	14	1	3	6	0	0	3	1								
Malaysian Red-tail Gold	22	12	0	1	8	0	0	1								
Red	15	0	0	0	0	4	11	0								

Wild Malaysian Yellow-tail Gold	7	1	0	0	6	0	0	0								
Farm Malaysian Yellow-tail Gold	16	8	0	1	7	0	0	0								
Indonesian Gold	11	8	0	0	2	0	0	1								
D32		250/250	250/270	250/280	260/260	260/280	270/270	280/280	280/300	290/300	320/320	330/330				
Wild Green	6	0	0	4	2	0	0	0	0	0	0	0				
Farm Green	14	1	0	8	4	1	0	0	0	1	0	0				
Malaysian Red-tail Gold	22	0	2	0	19	0	0	0	0	0	0	0				
Red	15	1	0	0	0	0	0	1	4	0	9	0				
Wild Malaysian Yellow-tail Gold	7	0	1	0	6	0	0	0	0	0	0	0				
Farm Malaysian Yellow-tail Gold	16	0	3	0	8	0	3	0	0	0	1	1				
Indonesian Gold	11	10	1	0	0	0	0	0	0	0	0	0				

D33		130/130	130/140														
Wild Green	6	6	0														
Farm Green	14	14	14														
Malaysian Red-tail Gold	22	21	1														
Red	15	10	4														
Wild Malaysian Yellow-tail Gold	7	7	0														
Farm Malaysian Yellow-tail Gold	16	15	1														
Indonesian Gold	11	9	2														
D35		160/160	160/180														
Wild Green	6	6	0														
Farm Green	14	14	0														
Malaysian Red-tail Gold	22	20	2														
Red	15	15	0														

Wild Malaysian Yellow-tail Gold	7	7	0														
Farm Malaysian Yellow-tail Gold	16	16	0														
Indonesian Gold	11	11	0														
D37		160/160	160/180	160/200	160/210	170/170	180/180	180/210	200/200	200/210	220/240	00/00					
Wild Green	6	4	0	0	0	0	2	0	0	0	0	0					
Farm Green	14	7	0	3	0	2	2	0	0	0	0	0					
Malaysian Red-tail Gold	22	3	1	1	3	0	0	4	0	1	0	0					
Red	15	2	0	0	0	0	0	0	2	0	11	0					
Wild Malaysian Yellow-tail Gold	7	0	6	0	0	0	0	1	0	0	0	0					
Farm Malaysian Yellow-tail Gold	16	8	3	0	0	0	0	5	0	0	0	0					
Indonesian Gold	11	2	2	0	0	0	0	7	0	0	0	0					

D38		170/170	180/180	180/190	180/220	180/240	190/190	190/220	200/200	200/230	200/240	220/220	220/230	220/240	00/00	
Wild Green	6	0	0	0	0	0	0	0	2	4	0	0	0	0	0	
Farm Green	14	0	0	0	0	0	0	0	5	9	0	0	0	0	0	
Malaysian Red-tail Gold	22	2	0	7	1	0	2	0	0	8	0	5	0	0	0	
Red	15	0	5	0	0	0	0	0	0	0	0	0	0	10	1	
Wild Malaysian Yellow-tail Gold	7	0	0	2	0	0	0	0	1	0	0	0	4	0	0	
Farm Malaysian Yellow-tail Gold	16	0	0	3	0	0	0	1	6	0	0	0	5	0	0	
Indonesian Gold	11	0	2	0	1	1	0	0	0	0	5	0	0	2	0	
D42		150/150	160/160	160/190	160/220	180/180	180/200	180/220	190/190	190/220	220/220	00/00				
Wild Green	6	0	0	0	2	0	0	4	0	0	0	0				
Farm Green	14	0	0	0	2	8	0	0	0	0	3	1				
Malaysian Red-tail Gold	22	0	1	0	0	20	0	0	0	0	0	1				
Red	15	0	0	0	0	12	1	0	1	1	0	0				

Wild Malaysian Yellow-tail Gold	7	0	1	2	4	0	0	0	0	0	0	0				
Farm Malaysian Yellow-tail Gold	16	0	3	6	6	0	0	0	0	0	0	1				
Indonesian Gold	11	4	0	0	0	0	0	0	0	7	0	0				
D72		90/90	90/100	100/100												
Wild Green	6	6	0	0												
Farm Green	14	9	5	0												
Malaysian Red-tail Gold	22	3	0	18												
Red	15	3	1	10												
Wild Malaysian Yellow-tail Gold	7	0	1	6												
Farm Malaysian Yellow-tail Gold	16	1	1	13												
Indonesian Gold	11	1	0	10												

D85		140/140	140/160	145/145	145/150	145/160	150/150	00/00								
Wild Green	6	0	0	6	0	0	0	0								
Farm Green	14	5	1	3	0	5	0	0								
Malaysian Red-tail Gold	22	13	3	0	0	0	0	0								
Red	15	4	0	6	3	0	0	2								
Wild Malaysian Yellow-tail Gold	7	5	2	0	0	0	0	0								
Farm Malaysian Yellow-tail Gold	16	13	3	0	0	0	0	0								
Indonesian Gold	11	0	6	5	0	0	0	0								
D88		130/150	130/165	150/150	150/165	155/180	00/00									
Wild Green	6	0	0	6	0	0	0									
Farm Green	14	7	0	5	2	0	0									
Malaysian Red-tail Gold	22	3	0	12	4	2	1									
Red	15	0	0	8	5	0	2									

Wild Malaysian Yellow-tail Gold	7	0	0	5	2	0	0										
Farm Malaysian Yellow-tail Gold	16	0	0	13	3	0	0										
Indonesian Gold	11	0	2	6	3	0	0										
D92		150/150	150/180	150/190	150/200	155/160	155/180	155/190	160/160	160/190	170/170	170/180	170/190	170/200	00/00		
Wild Green	6	0	0	4	0	0	0	0	0	0	0	0	0	2	0		
Farm Green	14	0	0	1	0	0	0	2	0	0	0	0	0	11	0		
Malaysian Red-tail Gold	22	1	7	0	1	0	0	0	0	1	6	2	4	0	0		
Red	15	0	0	0	0	0	1	1	9	4	0	0	0	0	0		
Wild Malaysian Yellow-tail Gold	7	0	0	1	0	2	0	0	4	0	0	0	0	0	0		
Farm Malaysian Yellow-tail Gold	16	0	0	1	0	3	0	0	12	0	0	0	0	0	0		
Indonesian Gold	11	4	1	0	0	2	0	1	0	0	0	0	2	0	1		

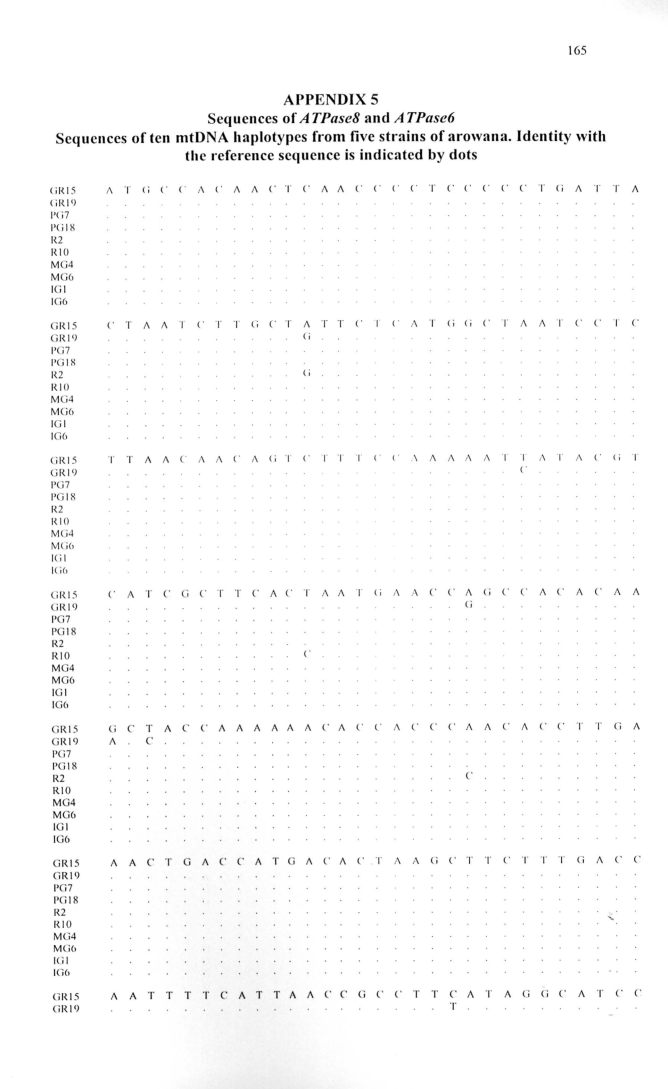
D94		200/205	200/230	205/205	205/210	205/230	210/210	210/235	230/235								
Wild Green	6	0	0	6	0	0	0	0	0								
Farm Green	4	1	2	4	7	0	0	0	0								
Malaysian Red-tail Gold	22	0	0	8	0	14	0	0	0								
Red	15	0	0	3	10	0	2	0	0								
Wild Malaysian Yellow-tail Gold	7	0	0	7	0	0	0	6	0								
Farm Malaysian Yellow-tail Gold	16	0	0	10	0	0	0	0	0								
Indonesian Gold	11	0	0	8	0	0	0	2	1								
D95		170/175	175/175	175/185	175/205	180/180	180/185	185/205	185/185	00/00							
Wild Green	6	0	0	0	0	3	1	0	2	0							
Farm Green	4	0	1	0	0	5	3	0	3	2							
Malaysian Red-tail Gold	22	0	0	0	0	10	4	1	7	0							
Red	15	1	0	0	0	10	1	0	0	0							

Wild Malaysian Yellow-tail Gold	7	0	1	0	1	5	0	0	0	0						
Farm Malaysian Yellow-tail Gold	16	0	4	0	1	10	0	0	0	2						
Indonesian Gold	11	0	5	1	0	0	0	3	0	0						

APPENDIX 5

Sequences of *ATPase8* and *ATPase6*

Sequences of ten mtDNA haplotypes from five strains of arowana. Identity with the reference sequence is indicated by dots



```
PG7    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
PG18   . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
R2     . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
R10    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
MG4    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
MG6    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
IG1    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
IG6    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

GR15   C C C T G A T C G C C C T A G C C C T C A C A C T C C C G T
GR19   . . . . . . . . . . . . . . . . . . . . . . . . . . . . A .
PG7    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
PG18   . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
R2     . . . . . . . . . . . . . . . . . . . T . . . . . . . . . C
R10    . . . . . . . . . . . . . . . . . . . T . . . . . . . . . .
MG4    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
MG6    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
IG1    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
IG6    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

GR15   G A A T C C T A T A C C C C A C C C C A C A A A A C C G C T
GR19   . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
PG7    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
PG18   . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
R2     . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
R10    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
MG4    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
MG6    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
IG1    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
IG6    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

GR15   G C C T A A A T A A C C G C C T C C T C A C C T T A C A A G
GR19   . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
PG7    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
PG18   . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
R2     . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
R10    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
MG4    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
MG6    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
IG1    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
IG6    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

GR15   C C T G A T T C A T T C G C C A A C T T A C A C A T C A A C
GR19   . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
PG7    . . . . C . . . . . . . . . . . . . . . . . . . . . . . G .
PG18   . . . . . . . . . . . . . . . . . . . . . . . . . . . . G .
R2     . . . . . . . . . . . . . . . . . . . . . . . . . . . . G .
R10    . . . . . . . . . . . . . . . . . . . . . . . . . . . . G .
MG4    . . . . . . . . . . . . . . . . . . . . . . . . . . . . G .
MG6    . . . . C . . . . . . . . . . . . . . . . . . . . . . . G .
IG1    . . . . . . . . . C . . . . . . . . . . . . . . . . . . G .
IG6    . . . . . . . . . . . . . . . . . . . . . . . . . . . . G .

GR15   T G T T C C T T C C T A T T A A C C C A G G G G G C C A C A
GR19   . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
PG7    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
PG18   . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
R2     . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
R10    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
MG4    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
MG6    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
IG1    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
IG6    . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

GR15   A A T G A A C A C T T C T C C T A A C C T C C G T C C T A C
GR19   . . . . . G . . . . . . . . . . . . . . . . . . . . . . . .
PG7    . . . . . G . . . . . . . T . . . . . . . . . . . . . . . .
PG18   . . . . . . . . . . . . . T . . . . . . . . . . . . . . . .
R2     . . . . . . . T . . . . . . . . . . . . . . . . . . . . . .
R10    . . . . . . . T . . . . . . . . . . . . . . . . . . . . . .
MG4    . . . . . G . . . . . . . . . . . . . . . . . . . . . . . .
MG6    . . . . . G . . . . . . . . . . . . . . . . . . . . . . . .
IG1    . . . . . G . . . . . . . . . . . . . . . . . . . . . . . .
IG6    . . . . . G . . . . . . . . . . . . . . . . . . . . . . . .
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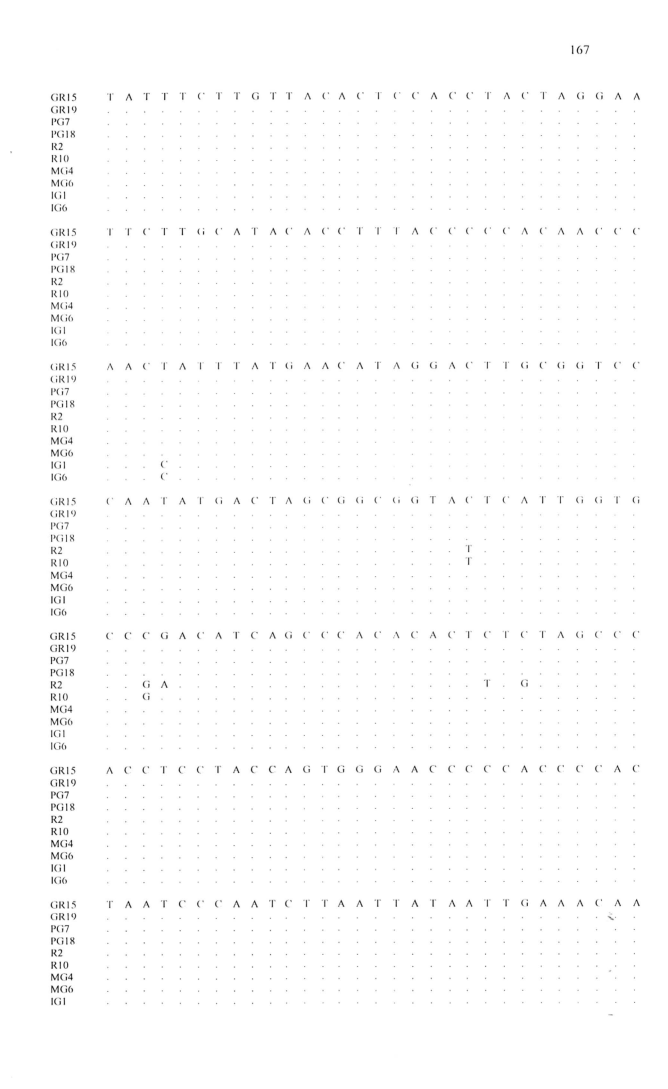
GR15 T A T T T C T T G T T A C A C T C C A C C T A C T A G G A A
GR19 . . . .
PG7 . . . .
PG18 . . . .
R2 . . . .
R10 . . . .
MG4 . . . .
MG6 . . . .
IG1 . . . .
IG6 . . . .
GR15 T T C T T G C A T A C A C C T T T A C C C C C A C A A C C C
GR19 . . . .
PG7 . . . .
PG18 . . . .
R2 . . . .
R10 . . . .
MG4 . . . .
MG6 . . . .
IG1 . . . .
IG6 . . . .
GR15 A A C T A T T T A T G A A C A T A G G A C T T G C G G T C C
GR19 . . . .
PG7 . . . .
PG18 . . . .
R2 . . . .
R10 . . . .
MG4 . . . .
MG6 . . . .
IG1 . . . . C . . . .
IG6 . . . . C . . . .
GR15 C A A T A T G A C T A G C G G C G G T A C T C A T T G G T G
GR19 . . . .
PG7 . . . .
PG18 . . . .
R2 . . . . T . . . . . .
R10 . . . . T . . . . . .
MG4 . . . .
MG6 . . . .
IG1 . . . .
IG6 . . . .
GR15 C C C G A C A T C A G C C C A C A C A C T C T C T A G C C C
GR19 . . . .
PG7 . . . .
PG18 . . . .
R2 . . G A . . . . T . G . . . .
R10 . . G . . . .
MG4 . . . .
MG6 . . . .
IG1 . . . .
IG6 . . . .
GR15 A C C T C C T A C C A G T G G G A A C C C C C A C C C C C A C
GR19 . . . .
PG7 . . . .
PG18 . . . .
R2 . . . .
R10 . . . .
MG4 . . . .
MG6 . . . .
IG1 . . . .
IG6 . . . .
GR15 T A A T C C C A A T C T T A A T T A T A A T T G A A A C A A
GR19 . . . .
PG7 . . . .
PG18 . . . .
R2 . . . .
R10 . . . .
MG4 . . . .
MG6 . . . .
IG1 . . . .

IG6 . . . .

GR15 T C A G C C A A T T T A T T C G A C C A A T C G C C C T A G
GR19 . . . .
PG7 . . . .
PG18 . . . .
R2 . . . .
R10 . . . .
MG4 . . . .
MG6 . . . .
IG1 . . . .
IG6 . . . .

GR15 G A G T T C G G C T T A C C G C C A A C C T C A C A G C A G
GR19 . . . .
PG7 . . . .
PG18 . . . .
R2 . . . .
R10 . . . .
MG4 . . . .
MG6 . . . .
IG1 . . . .
IG6 . . . .

GR15 G C C A C C T A C T A A T T C A A C T A A T T A G C A C A G
GR19 . . . . G . . . .
PG7 . . . .
PG18 . . . .
R2 . . . . G . . . .
R10 . . . .
MG4 . . . .
MG6 . . . .
IG1 . . . .
IG6 . . . .

GR15 C A G C C T T C T A C C T A G C C T T T T C A A T A C C A A
GR19 . . . . A . . . .
PG7 . . . . A . . . .
PG18 . . . . A . . . .
R2 . . . . A . . . .
R10 . . . . A . . . .
MG4 . . . . A . . . .
MG6 . . . . A . . . .
IG1 . . . . A . . . .
IG6 . . . . A . . . .

GR15 C C G T A T C A A T T C T A A C C A T A G G C C T T G T T C
GR19 . . . . C . . .
PG7 . . . . C . . A
PG18 . . . . C . . A
R2 . . . . G . . . . A
R10 . . . . C . . A
MG4 . . . . C . . A
MG6 . . . . C . . A
IG1 . . . . C . . A
IG6 . . . . C . . .

GR15 T A C T C C T T T C C A T A T T A G A A C T A G C C G T C G
GR19 . . . .
PG7 . . . .
PG18 . . . .
R2 . . . . G . . . .
R10 . . . . G . . . .
MG4 . . . .
MG6 . . . .
IG1 . . . .
IG6 . . . .

GR15 C A A T C A T C C A A G C T T A T G T C T T C G T C C T A C
GR19 . . . .
PG7 . . . .
PG18 . . . .
R2 . . . .
R10 . . . . G . . . .
MG4 . . . .

MG6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
IG1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
IG6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

GR15	T	A	G	T	A	A	G	C	C	T	C	T	A	T	C	T	A	C	A	A	G	A	A	T	C	C	G	T	T	T
GR19	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PG7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PG18	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
R2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	G	.	.	.	.	.	.	.	.	.	.	.	.	.
R10	.	.	.	.	.	.	.	.	.	.	.	.	.	C	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
MG4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	T	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
MG6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	T	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
IG1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
IG6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

GR15	A	A
GR19	.	.
PG7	.	.
PG18	.	.
R2	.	.
R10	.	.
MG4	.	.
MG6	.	.
IG1	.	.
IG6	.	.

APPENDIX 6

Genebank Accession Number of Each Haplotype

Haplotype	Genebank accession number
GR15	AY183909
GR19	AY183910
MRTG7	AY183911
MRTG18	AY183912
R2	AY183913
R10	AY184929
MYTG4	AY184930
MYTG6	AY185208
IG1	AY185209
IG6	AY186255

GR: Green

MRTG: Malaysian red-tail gold

R: Red

MYTG: Malaysian yellow-tail gold

IG: Indonesian gold