

Determining the extent of Grey Duck × Mallard hybridisation in New Zealand

Background

Hybridisation between the native Grey Duck *Anas superciliosa* and introduced Mallard *A. platyrhynchos* is common in New Zealand.

Exchange of mtDNA between the two species' populations is extensive and in both directions.

Identification of wild hybrids by plumage has proved difficult and confusing because of apparent variability in female Mallard characteristics arising from the game farm stock released.



Grey Duck



Mallard

James Green

44 Park St., Dunedin,
New Zealand.
sifty@es.co.nz

Graham Wallis

Department of Zoology,
University of Otago,
Dunedin, New Zealand.
graham.wallis@stonebow.
otago.ac.nz

Murray Williams

Department of Conservation,
Wellington, New Zealand.
mwilliams@doc.govt.nz

Study objectives

- **Hybrid identification** — establish a method for identifying hybrids from plumage characters.
- **Hybrid abundance** — determine the proportions of hybrids in duck hunters' bags.

Materials and methods

Known hybrids: 326 specimens of 12 hybrid categories from a 1967-73 controlled hybrid breeding programme.

Hunter specimens: 2131 specimens (head, wing, leg) collected from 124 hunters in 9 regions of NZ with varying abundance of Mallards.

Characters and data: Head, bill, wing, tarsus and mid toe were measured with calipers; leg colour, face pattern, bill colour/pattern, speculum colour, size and colour of alar bars above and below speculum were scored on a 6 point scale.

Analysis: Discriminant function analyses involving different poolings of hybrid categories and different combinations of characters.

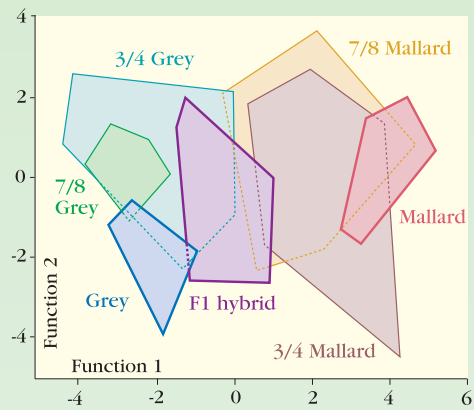
Results

Hybrid identification

Discriminant function analyses using characters easiest to measure in the field produced a function (1) based mostly on plumage scores and accounting for 90% of variance.

Function	1	2	3	4	5
Face	0.464	0.316	-0.222	-0.036	0.859
Lower alar bar	0.392	0.201	0.773	-0.726	-0.111
Upper alar bar	0.567	-0.124	-0.739	0.381	-0.509
Tarsus	-0.211	0.790	0.434	0.701	-0.180
Wing length	0.083	1.077	0.338	0.252	0.237
Eigen value	3.842	0.248	0.158	0.011	0.007
% of variance	90.1	5.8	3.7	0.25	0.15

A plot of functions 1 and 2 indicated that F1 hybrids could be accurately discriminated from parentals but separating other hybrid categories was more problematic.



Known hybrid group	n	% in predicted group			
		Grey	Grey-like	F1	Mall
Grey	21	76	14	0	0
Grey-like hybrid	101	4	90	6	0
F1 hybrid	67	1	37	53	9
All Mallards	138	0	4	13	83

Best discrimination was obtained by limiting hybrid categories to pure Grey, "Grey-like" (3/4 and 7/8 greys), F1, and "all Mallards" (pure Mallard plus all hybrids >50% mallard). Even so, not all known hybrids and parental specimens could be correctly categorised.

Hybrid abundance

Ducks provided by hunters were assigned to one of 4 categories using the known hybrids discriminant function.



Region	n	% in predicted group			
		Grey	Grey-like	F1	Mall
Northland	265	21	13	3	63
Waikato	398	4	5	2	89
Bay of Plenty	205	15	4	3	78
Manawatu	233	7	6	1	86
Nelson	141	23	9	7	61
West Coast	240	26	13	1	59
Sth Canterbury	133	7	4	2	87
Otago	87	1	2	2	95
Southland	159	1	3	2	94

Grey Duck



Mallard

Conclusions

- Discriminant functions based on plumage patterns alone were less accurate than those which included one or more measures of size.
- Mallard-like hybrids of both sexes were phenotypically indistinguishable from pure Mallards.
- Discrimination between F1 and grey-like hybrids was poor.
- Proportional abundance of detectable grey-like hybrids was greatest in regions where Grey Ducks remain numerous.
- Ducks of mixed genetic inheritance are probably much more numerous than can be determined by these means.