



"Bomford, Mary -
BRS"
<Mary.Bomford@brs.gov.au>

19/06/2007 10:41 AM

To Rebecca.Newton@health.gov.au

cc

bcc

Subject RE: Danio rerio risk assessment.
[SEC=UNCLASSIFIED]

History: This message has been forwarded.

UNCLASSIFIED

Hi Rebecca

Attached table has the scores for all exotic freshwater fish introduced to Australia - both successful and failed. I've added *Danio rerio* right at the end. I've also added the cutoff thresholds converting risk scores to risk ranks at the end. Finally I've put in a graph showing the numbers of successful and failed fish species in each risk rank.

Lots of fish score higher than *Danio rerio*. I'd have been really happy if my risk model had scored all the fish that have successfully established in Australia as Extreme.

Please phone me on 6272 4263 if you have any queries.

regards

Mary

From: Rebecca.Newton@health.gov.au [mailto:Rebecca.Newton@health.gov.au]
Sent: Tuesday, 19 June 2007 10:09 AM
To: Bomford, Mary - BRS
Cc: McNee, Alex - BRS; Robyn.Cleland@health.gov.au; Mark.Kinnear@health.gov.au
Subject: Re: Danio rerio risk assessment. [SEC=UNCLASSIFIED]

Hi Mary

Thank you for your rapid assessment of *Danio rerio*. We were a little surprised that this species has an establishment risk score of 19. I imagine only carp and goldfish would score higher.

Would you be able to provide some more details on the input data used to make the assessment?
Which factors assessed contributed greatest to this number?

How does this compare to other aquarium species you have assessed?

I look forward to hearing from you.

Regards
 Dr Rebecca Newton
 Contained Dealings Evaluation Section
 Office of the Gene Technology Regulator
 Phone 02 6271 4351
 Fax 02 6271 4202
 Email Rebecca.Newton@health.gov.au

"Bomford, Mary - BRS" <Mary.Bomford@brs.gov.au>

10/1/20



01/06/2007 09:01 AM

To Rebecca.Newton@health.gov.au
 CC "McNee, Alex - BRS" <Alex.McNee@brs.gov.au>
 Subject Danio rerio risk assessment. [SEC=UNCLASSIFIED]

Hi Rebecca

Attached please find the CLIMATE match map for *Danio rerio* in Australia. This is a high match to northern Australia - the species would have a high likelihood of establishing there if it was released in sufficient numbers.

The overall Establishment Risk Score for *Danio rerio* in Australia is 19.

An exotic finfish species' Establishment Risk Score is converted to an Establishment Risk Rank (Low, Moderate, Serious or Extreme) using the following cut-off thresholds:

<u>Establishment Risk Rank</u>	<u>Establishment Risk Score</u>
Extreme	= 20
Serious	15-19
Moderate	8-14
Low	= 7

So *Danio rerio* is right at the top of the Serious range and two thirds (10/15 species) of freshwater fish released in Australia with a 'Serious' Establishment Risk Rank have established exotic populations.

Regards

Mary

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Establishment risk scores for exotic freshwater finfish species introduced to Australia using PC CLIMATE outputs for climate match scores

Appendix K Table K1. Establishment risk scores for exotic finfish species introduced to Australia with new climate match scores based on PC CLIMATE. A. Successful introductions.

B. Failed introductions (recorded but not known to be established).

The Climate Match Scores in Column A are based on PC CLIMATE Euclidian match ($\Sigma 60\%$ level) converted to Climate Match Scores using the cut-off thresholds presented in Figure 10. The values in Columns B-E are taken directly from Bomford and Glover (2004). The Total Establishment Risk Score (column F) is the sum of the scores in columns A-E. The Total Establishment Risk Score (column F) is sorted in ascending order.

A	B	C	D	E	F	G
Climate Match Score 1-8	Overseas Range Score 0-4	Establishment Score 0-3	Introduction Success Score 0-4	Taxa Risk Score 0-5	Total Establishment Risk Score 0-24	Establishment Risk Rank
4	2	0	0	4	10	Moderate
4	0	1	2	3	10	Moderate
3	0	1	2	5	11	Moderate
4	2	2	2	3	13	Moderate
3	2	2	4	3	14	Moderate
4	0	2	4	4	14	Moderate
2	3	2	4	4	15	Serious
3	4	2	4	3	16	Serious
4	1	2	4	5	16	Serious
5	1	2	4	5	17	Serious
4	3	2	4	5	18	Serious
5	2	3	4	4	18	Serious
4	2	3	4	5	18	Serious
4	4	3	3	4	18	Serious
5	4	3	4	3	19	Serious
5	3	2	4	5	19	Serious

have they
est. elsewhere
has many
intros
successful
(%)

A. Successfully introduced species1	A	B	C	D	E	F	G
	Climate Match Score 1-8	Overseas Range Score 0-4	Establishment Score 0-3	Introduction Success Score 0-4	Taxa Risk Score 0-5	Total Establishment Risk Score 0-24	Establishment Risk Rank
Sailfin molly <i>Poecilia latipinna</i>	6	2	3	4	5	20	Extreme
Platy <i>Xiphophorus maculatus</i>	6	2	3	4	5	20	Extreme
Green swordtail <i>Xiphophorus hellerii</i>	7	1	3	4	5	20	Extreme
Redbelly tilapia <i>Tilapia zillii</i>	6	4	3	3	4	20	Extreme
Redfin perch <i>Perca fluviatilis</i>	5	3	3	4	5	20	Extreme
Tench <i>Tinca tinca</i>	6	3	3	4	5	21	Extreme
Oscar <i>Astronotus ocellatus</i>	5	4	3	4	5	21	Extreme
Rainbow trout <i>Oncorhynchus mykiss</i>	7	4	3	4	3	21	Extreme
Brown trout <i>Salmo trutta</i>	6	4	3	4	4	21	Extreme
Three-spot gourami <i>Trichogaster trichopterus</i>	5	4	3	4	5	21	Extreme
Mosquitofish <i>Gambusia holbrooki</i> + <i>affinis</i>	6	4	3	4	5	22	Extreme
Guppy <i>Poecilia reticulata</i>	6	4	3	4	5	22	Extreme
Goldfish <i>Carassius auratus</i>	7	4	3	4	5	23	Extreme
Mozambique tilapia <i>Oreochromis mossambicus</i>	8	4	3	4	4	23	Extreme
European carp <i>Cyprinus carpio</i>	8	4	3	4	5	24	Extreme

↑
genus risk
family risk

good discrimination
between successes &
failures

10 introductions at least 1 will be successful.

propagate species - pet shops/aquaria
 correlation of # (species) / establishment risk
 kept in pet shops

propagate more important than climate match etc.

B. Unsuccessfully introduced species (recorded but not known to be established)	A		B	C	D	E	F	G
	Climate match score 1-8	Overseas range score 0-4						
Sobayta seabream <i>Sparidentex hassta</i>	1	0	1	2	2	2	6	Low
Pearl cichlid <i>Geophagus brasiliensis</i>	3	1	0	0	3	7	7	Low
Redbanded perch <i>Hypoplectrodes humtii</i>	2	0	1	2	2	7	7	Low
Japanese seabass <i>Lateolabrax japonicus</i>	3	2	1	2	0	8	8	Moderate
Common triplefin <i>Forsterygion lapillum</i>	4	0	1	2	2	9	9	Moderate
Dominican gambusia <i>Gambusia dominicensis</i>	2	0	1	2	5	10	10	Moderate
Green terror <i>Aequidens rivulatus</i>	3	1	1	2	3	10	10	Moderate
Banded cichlid <i>Heros severus</i>	4	2	0	0	4	10	10	Moderate
American flagfish <i>Jordanella floridae</i>	2	0	1	2	5	10	10	Moderate
Sumatra barb <i>Puntius tetrazona</i>	1	0	3	3	5	12	12	Moderate
Plainfin frogfish <i>Porichthys notatus</i>	4	4	1	2	2	13	13	Moderate
Redhead <i>Vieta synspila</i>	3	4	1	2	4	14	14	Moderate
Chinook salmon <i>Oncorhynchus tshawytscha</i>	4	4	2	1	3	14	14	Moderate
Firemouth cichlid <i>Thorichthys meeki</i>	5	0	3	4	4	16	16	Serious
Atlantic salmon <i>Salmo salar</i>	5	4	3	1	4	17	17	Serious
Wami tilapia <i>Oreochromis urolepis</i>	7	1	3	4	4	19	19	Serious
Blue tilapia <i>Oreochromis aureus</i>	6	3	3	4	4	20	20	Extreme
Rosy barb <i>Puntius conchonus</i>	6	3	3	4	5	21	21	Extreme
Zebra danio <i>Danio rerio</i>	5	3	3	3	5	19	19	Serious

leaf/long square with record

Arthington model

1 established in Columbia - successful.

1 out in New Mexico - unsuccessful.

000160

Simon Barry
 sample size taken into account when calculating family risk of success

An exotic finfish species' Establishment Risk Score is converted to an Establishment Risk Rank (Low, Moderate, Serious or Extreme) using the following cut-off thresholds:

Establishment Risk Rank	Establishment Risk Score
Extreme	≥ 20
Serious	15-19
Moderate	8-14
Low	≤ 7

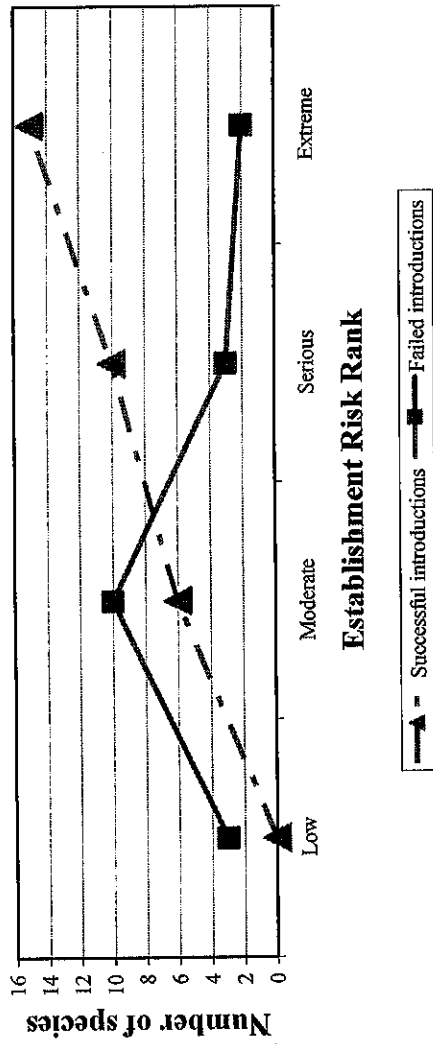


Figure 1. Number of species in each Establishment Risk Rank compared for successful and failed exotic freshwater finfish introduced to Australia with cut-off thresholds adjusted downwards.