

Supplementary Information

Shallow seamounts represent speciation islands for circumglobal yellowtail *Seriola lalandi*

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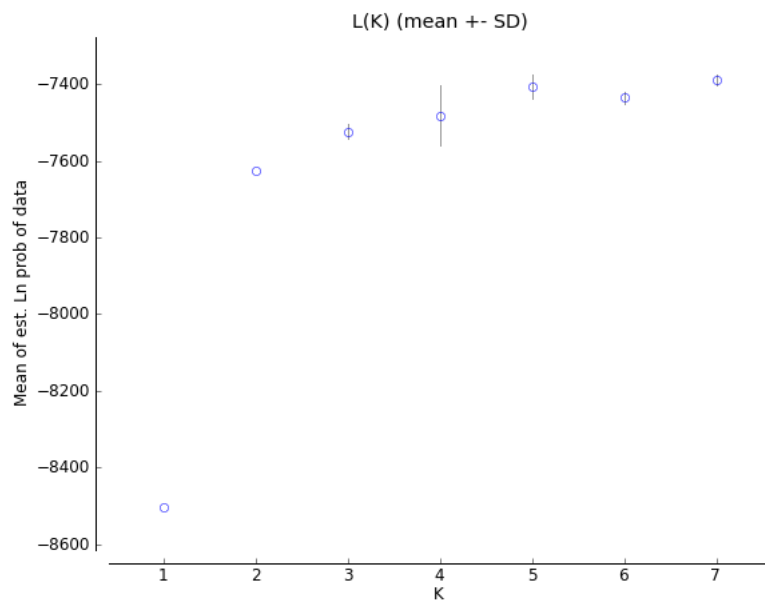
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a)



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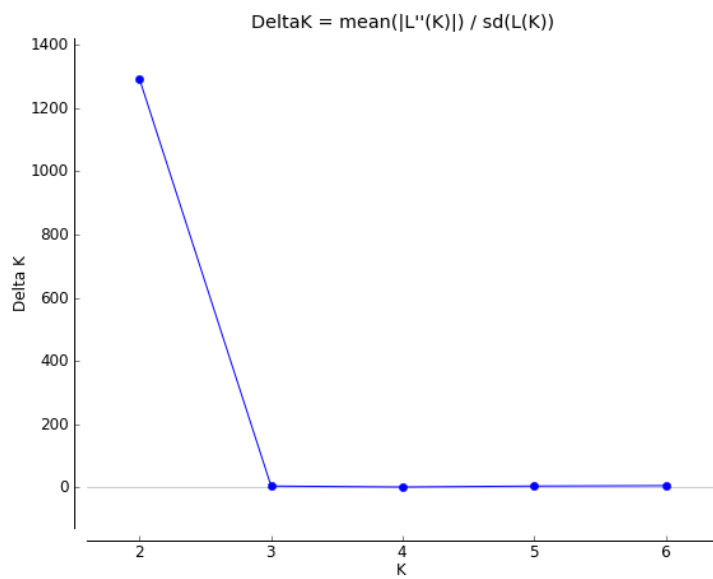


Figure S1

(a) The posterior probability of the data, $L(K)$ for each K and (b) ΔK as a function of K following Evanno *et al.* (2005) for the sampling localities.

Table S1

Summary of genetic variation for six analysed microsatellite loci at seven *Seriola lalandi* sampling sites.

		Loci						
Samples		<i>Sdu10</i>	<i>SduCA107</i>	<i>Sdu29</i>	<i>Sdu32</i>	<i>Sdu46</i>	<i>SduCA4j</i>	Mean
North	<i>He</i>	0.4753	0.8978	0.8377	0.8491	0.4561	0.8068	0.7205
Blinder	<i>Ho</i>	0.5556	0.8148	0.6552	0.8462	0.4444	0.6071	0.6539
(B)	<i>Na</i>	2	17	10	14	5	7	
N = 30	<i>Ar</i>	2.000	15.398	9.035	12.550	4.918	6.921	
	<i>F_{IS}</i>	-0.150	0.111	0.235	0.023	0.044	0.264	0.111
Yzerfontein	<i>He</i>	0.4898	0.8937	0.7997	0.8025	0.4297	0.8469	0.7104
(C)	<i>Ho</i>	0.4286	0.7778	0.5357	0.6500	0.4167	0.8571	0.6110
N = 29	<i>Na</i>	2	15	8	10	4	12	
	<i>Ar</i>	2.000	13.727	7.553	10.000	3.950	11.153	
	<i>F_{IS}</i>	0.143	0.148	0.346	0.215	0.052	0.006	0.160
Cape Point	<i>He</i>	0.4231	0.8869	0.8546	0.8629	0.5826	0.7689	0.7298
(E)	<i>Ho</i>	0.4615	0.8367	0.6800	0.8182	0.5278	0.9787	0.7172
N = 50	<i>Na</i>	3	20	15	17	6	6	
	<i>Ar</i>	2.513	13.718	11.162	13.433	5.437	5.655	
	<i>F_{IS}</i>	-0.078	0.067	0.214	0.063	0.108	-0.263	0.029
Struis Bay	<i>He</i>	0.4783	0.8946	0.8566	0.8350	0.6234	0.8178	0.7510
(G)	<i>Ho</i>	0.6667	0.7551	0.8400	0.8200	0.6000	0.9600	0.7736
N = 55	<i>Na</i>	2	18	16	16	6	9	
	<i>Ar</i>	2.000	13.169	11.472	11.649	5.479	7.842	
	<i>F_{IS}</i>	-0.385	0.166	0.029	0.028	0.050	-0.164	-0.020
Port Elizabeth	<i>He</i>	0.5019	0.8885	0.8355	0.8484	0.5696	0.8333	0.7462
(H)	<i>Ho</i>	0.4167	0.8056	0.9714	0.7778	0.6400	0.8485	0.7433
N = 37	<i>Na</i>	3	20	13	16	5	9	
	<i>Ar</i>	2.806	15.267	11.134	12.932	4.800	8.848	

	<i>F_{IS}</i>	0.184	0.107	-0.149	0.097	-0.103	-0.003	0.019
Walters Shoal	<i>He</i>	0.487	0.917	0.868	0.802	0.691	0.731	0.750
(WS)	<i>Ho</i>	0.764	0.891	0.778	0.982	0.891	0.963	0.878
N = 55	<i>Na</i>	2	18	14	11	5	11	
	<i>Ar</i>	2.00	14.640	10.430	8.730	4.973	8.484	
	<i>F_{IS}</i>	-0.563	0.039	0.114	-0.216	-0.281	-0.309	-0.162
Vema	<i>He</i>	0.488	0.930	0.846	0.805	0.613	0.865	0.753
(V)	<i>Ho</i>	0.590	0.798	0.785	0.947	0.695	0.947	0.794
N = 95	<i>Na</i>	4	26	16	16	7	15	
	<i>Ar</i>	2.588	15.970	10.627	10.842	5.612	9.769	
	<i>F_{IS}</i>	-0.204	0.147	0.077	-0.172	-0.128	-0.130	-0.049
Overall	<i>He</i>	0.626	0.934	0.894	0.858	0.764	0.873	
	<i>Ho</i>	0.579	0.811	0.764	0.871	0.649	0.911	
	<i>Na</i>	7	36	22	25	10	17	
	<i>Ar</i>	3.358	16.831	12.477	12.241	6.859	10.540	
	<i>F</i>	0.080	0.134	0.147	-0.014	0.152	-0.042	
	PHWE	0.000	0.000	0.000	0.000	0.000	0.000	

Ho = observed heterozygosity; *He* = expected heterozygosity; *Na* = number of alleles; *Ar* = allelic richness, *F_{IS}* = inbreeding coefficient. PHWE = probability of Hardy-Weinberg equilibrium

Table S2**Pairwise F_{ST} (1,000 permutations) for 4 loci.**

	North Blinder	Yzerfontein	Cape Point	Struis Bay	Port Elizabeth	Walters Shoal	Vema
North Blinder	-						
Yzerfontein	0.004	-					
Cape Point	0.011	0.023	-				
Struis Bay	0.010	0.018	0.001	-			
Port Elizabeth	0.015	0.021	0.006	0.001	-		
Walters Shoal	0.191*	0.199*	0.184*	0.161*	0.174*	-	
Vema	0.195*	0.203*	0.186*	0.166*	0.176*	0.008*	-

*Significant F_{ST} p -values ($p < 0.05$) after Bonferroni correction**Table S3**

Statistical power for detecting various true levels of population differentiation (F_{ST}) by means of χ^2 and Fisher's exact test when using the present loci, allele frequencies, and sample sizes. The power is expressed as the proportion of simulations that provide statistical significance at the 0.05 level.

F_{ST}	χ^2	Fisher
$F_{ST} = 0.049$	1.000	1.000
$F_{ST} = 0.025$	1.000	1.000
$F_{ST} = 0.010$	1.000	1.000
$F_{ST} = 0.002$	0.989	0.989

Table S4

Nei's genetic distances between the seven *S. lalandi* sampling localities for all loci combined.

	North Blinder	Yzerfontein	Cape Point	Struis Bay	Port Elizabeth	Walters Shoal
North Blinder	-					
Yzerfontein	0.069	-				
Cape Point	0.026	0.105	-			
Struis Bay	0.016	0.077	0.018	-		
Port Elizabeth	0.027	0.046	0.013	0.016	-	
Walters Shoal	0.816	0.938	0.832	0.694	0.779	-
Vema	0.985	0.921	0.939	0.802	0.782	0.143

Table S5

Frequency of occurrence (FO) of prey items from *S. lalandi* stomachs sampled at Vema, South Africa and Walters Shoal.

Group	Class	Order	Family	Species	Vema	South Africa	Walters Shoal
<i>Fish</i>					68.5	74.2	67.9
	Actinopterygii				24.1		14.3
		Beloniformes					
			Hemiramphidae			3.23	
			Scomberesocidae				
				Scomberesox saurus		4.84	
		Clupeiformes					
			Clupeidae				
				Sardinops sagax		16.13	
		Myctophiformes					
			Myctophidae		16.7		7.1
				Diaphus lucidus	7.4		
				Diaphus problematicus	1.9		
				Gymnoscopelus piabilis	1.9		
				Hygophum proximum	1.9		
				Myctophum nitidulum	1.9		
				Myctophum phengodes	3.7		
				Notoscopelus spp			3.6
				Symbolophorus barnadi	1.9		
				Symbolophorus boops	1.9		
		Perciformes			11.1		7.1
			Acanthuridae		1.9		
			Carangidae		3.7		3.6

	Decapterus macrosoma	1.61		
	Trachurus delagoa	3.7		
	Trachurus trachurus	11.3	3.6	
	Gempylidae	1.9	3.6	
	Labridae	3.7		
	Wrasse spp	1.9		
	Nomeidae	5.6		
	Cubiceps capensis	1.9		
	Cubiceps careulus	3.7		
	Sparidae	1.6		
	Boopsoidea inornata	1.61		
	Scorpaeniformes	6.45		
	Unknown species	29.6	50.0	28.6
<i>Molluscs</i>		7.4	1.6	0
	Bivalvia	1.9		
	Ostreoida			
	Ostreoidae	1.9		
	Mytilida			
	Mytilidae			
	Perna perna	1.61		
	Gastropoda	5.6		
	Littorinimorpha			
	Atlantidae	5.6		
<i>Cephalopods</i>		18.5	9.7	28.6
	Cephalopoda	7.4		14.3
	Myopsida			
	Loliginidae			

	Loligo vulgaris	4.84		
	Octopoda	3.6		
	Argonautidae			
	Argonauta argo	1.61		
	Teuthida	7.4	3.6	
	Histioteuthidae	5.6		
	Octopoteuthidae			
	Octopoteuthis rugosa	3.6		
	Ommastrephidae	1.9		
	Unknown species	13.0	5.4	14.3
Crustaceans		81.5	21.0	64.3
	Malacostraca	81.5	46.4	
	Amphipoda	11.1	3.2	7.1
	Hyperiididae	3.6		
	Themisto gaudichaudi	3.23		
	Platyscelidae			
	Platyscelus ovoides	7.4		
	Decapoda	16.7	19.4	17.9
	Paguroidea			
	Hermit crab larvae	3.7		
	Portunidae	7.1		
	Portunid crab	3.6		
	Portunus pelagicus	7.1		
	Euphausiacea			
	Euphausiidae	81.5	3.2	
	Euphausia lucens	1.61		
	Isopoda	14.3		

	Mysida			
	Mysidae			
	Gastrosaccus psammodytes	1.61		
	Stomatopoda			
	Lysiosquillidae			
	Lysiosquilla tredecimdentata	25		
	Odontodactylidae			
	Odontodactylus scyllarus	10.7		
	Unknown species	1.6	10.7	
Other		7.4	1.6	39.3
	Polychaeta	1.61		
	Unknown species	3.7		17.9

Table S6

Macroscopic staging of female and male gonads according to Dunn (2014).
For histological descriptions of female and male gonads see Dunn (2014).

Maturity Stage	Macroscopic Condition
FEMALES	FEMALES
(1) Immature	Ovary lobes are oval in shape and thread-like at less than 60 mm in length.
(2) Active	Ovary lobes rounded in shape and much larger in size than in immature fish.
(3) Developing	Ovary lobes rounded and greater than 60 mm in length.
(4) Late Developing	Ovary large and yellow in colour with oocytes becoming visible.
(5) Ripe	Ovary firm and large, mature and hydrated oocytes are visible.
(6) Spent	Ovary flaccid, decreased in size and bloody, no oocytes are visible.
MALES	MALES
(1) Immature	Thread-like lobes.
(2) Active	Elongated, oval to triangular in cross-section.
(3) Mature	Elongated, larger in size and triangular in cross-section, pink tinge.
(4) Ripe	Large and soft, creamy white in colour, milt present in main duct.