



Supplementary Material

Microsatellite Markers Used for Genetic Monitoring of Exotic Common Carp Variants (Common Carp and Scale Carp) in the River Chenab, Punjab, Pakistan

Fouzia Tabassum^{1,2}, Muhammad Farhan Khan³, Muhammad Tayyab⁴, Shakeela Parveen^{2*}, Muhammad Hussain⁵, Uzma Batool², Areeba Safdar⁶ and Laiba Shafique^{1*}

¹Guangxi Key Laboratory of Beibu Gulf Marine Biodiversity Conservation, Beibu Gulf University, Guangxi 535011, PR China

²Department of Zoology, Government Sadiq College Women University, Bahawalpur, 63100, Punjab, Pakistan

³Department of Chemistry, Gomal University, Dera Ismail Khan 29050, Pakistan

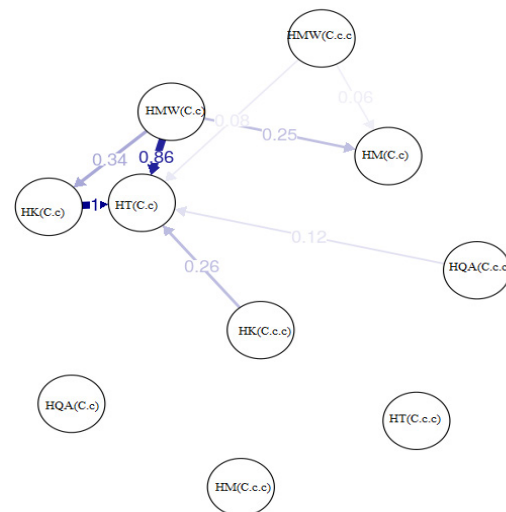
⁴Department of Zoology, Wildlife & Fisheries, University of Agriculture, Faisalabad 38000, Punjab, Pakistan

⁵Department of Veterinary Sciences, University of Veterinary and animal sciences, Lahore, Pakistan

⁶Department of Zoology, Bahauddin Zakariya University, Multan

Fouzia Tabassum and Muhammad Farhan Khan made equal contributions.

Relative migration network(filter threshold=0;1000 bootstraps; D method)



* Corresponding author: drshakeela@gscwu.edu.pk, laibazooologist@gmail.com
0030-9923/2026/0004-1785 \$ 9.00/0



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Supplementary Fig. 1. The directional relative migratory network of the populations of the common carp strains under study was created using the divMigrate method. The numerical values depicted on the arrows correspond to the relative migration coefficients that have been obtained from D statistics. The intensity of gene flows is positively correlated with the degree of line shading and thickness.

Supplementary Table SI. Genetic diversity parameters of five populations at ten microsatellite loci of *C. carpio* and *C. c. communis* in Chenab basin of Punjab, Pakistan.

Species	Popu- lation	Param- eters	MFW 3	MFW 4	MFW 6	MFW 7	MFW 11	MFW 13	MFW 15	MFW 17	MFW 26	MFW 31	Average
<i>C. carpio</i>	HT	N _a	8	4	6	4	5	6	7	6	6	4	6
		A _r	8.000	4.000	6.000	4.000	5.000	6.000	7.000	6.000	6.000	4.000	5.600
		H _o	0.533	0.367	0.433	0.333	0.400	0.467	0.600	0.467	0.467	0.367	0.443
		H _e	0.866	0.747	0.834	0.768	0.798	0.834	0.854	0.838	0.844	0.714	0.810
		F _{IS}	0.461	0.551	0.521	0.609	0.542	0.481	0.409	0.483	0.522	0.490	0.507
		Ne	6.222	3.665	5.391	3.948	4.426	5.408	5.629	5.497	5.600	3.352	4.914
	HM	N _a	6	5	6	3	4	6	6	5	6	4	5
		A _r	6.000	5.000	6.000	3.000	4.000	6.000	6.000	5.000	6.000	4.000	5.100
		H _o	0.533	0.367	0.433	0.267	0.400	0.433	0.467	0.467	0.400	0.333	0.4100
		H _e	0.843	0.749	0.786	0.644	0.755	0.786	0.808	0.760	0.836	0.693	0.7659
		F _{IS}	0.484	0.557	0.533	0.590	0.553	0.453	0.465	0.390	0.599	0.523	0.5147
		Ne	5.116	3.602	4.000	2.723	3.621	4.412	4.634	3.956	5.315	3.141	4.0520
	HK	N _a	7	4	5	4	4	5	5	4	6	4	4.8000
		A _r	7.000	4.000	5.000	4.000	4.000	5.000	5.000	4.000	6.000	4.000	4.800
		H _o	0.433	0.267	0.400	0.367	0.433	0.400	0.467	0.400	0.400	0.267	0.3833
		H _e	0.851	0.773	0.751	0.760	0.699	0.807	0.784	0.687	0.824	0.699	0.7634
		F _{IS}	0.530	0.739	0.509	0.561	0.531	0.508	0.409	0.422	0.593	0.622	0.5424
		Ne	6.007	3.881	3.713	3.840	3.031	4.839	4.358	3.082	4.391	3.197	4.0880
	HQ	N _a	5	3	5	4	4	5	5	4	6	4	4.5000
		A _r	5.000	3.000	5.000	4.000	4.000	5.000	5.000	4.000	6.000	4.000	4.5000
		H _o	0.400	0.267	0.300	0.267	0.200	0.367	0.433	0.433	0.233	0.267	0.3167
		H _e	0.794	0.646	0.801	0.649	0.658	0.786	0.747	0.727	0.818	0.742	0.7368
		F _{IS}	0.541	0.591	0.629	0.593	0.748	0.538	0.424	0.449	0.757	0.644	0.5914
		Ne	4.313	2.740	4.700	2.761	2.691	4.412	3.774	3.357	4.947	3.696	3.7390
	HMW	N _a	4	4	4	3	4	4	4	3	5	3	3.8000
		A _r	4.000	4.000	4.000	3.000	4.000	4.000	4.000	3.000	5.000	3.000	3.8000
		H _o	0.400	0.333	0.300	0.267	0.167	0.333	0.400	0.333	0.400	0.267	0.3200
		H _e	0.742	0.668	0.699	0.638	0.644	0.698	0.752	0.590	0.786	0.667	0.6884
		F _{IS}	0.549	0.600	0.614	0.678	0.744	0.609	0.472	0.439	0.572	0.604	0.5881
		Ne	3.329	2.609	3.150	2.497	2.723	3.004	3.838	2.381	4.116	2.908	3.0554
<i>C. c. carpio</i>	HT	N _a	6	4	5	4	4	6	7	4	5	3	4.8000
		A _r	6.000	4.000	5.000	4.000	4.000	6.000	7.000	4.000	5.000	3.000	4.8000
		H _o	0.500	0.300	0.400	0.267	0.367	0.433	0.500	0.433	0.400	0.400	0.4000
		H _e	0.824	0.749	0.774	0.775	0.738	0.840	0.854	0.711	0.785	0.708	0.7759
		F _{IS}	0.471	0.644	0.526	0.739	0.544	0.523	0.493	0.467	0.534	0.562	0.5503
		Ne	4.915	3.633	4.024	3.960	3.586	5.644	5.702	3.207	4.216	2.976	4.1862
	HM	N _a	6	4	5	3	3	5	7	5	4	4	4.6000
		A _r	6.000	4.000	5.000	3.000	3.000	5.000	7.000	5.000	4.000	4.000	4.6000

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Species	Popu- lation	Param- eters	MFW 3	MFW 4	MFW 6	MFW 7	MFW 11	MFW 13	MFW 15	MFW 17	MFW 26	MFW 31	Average
HK	HK	H _o	0.467	0.300	0.367	0.300	0.333	0.400	0.500	0.400	0.400	0.400	0.4067
		H _e	0.816	0.721	0.784	0.637	0.684	0.793	0.852	0.787	0.734	0.716	0.7525
		F _{IS}	0.254	0.626	0.613	0.579	0.557	0.616	0.417	0.572	0.502	0.574	0.5310
		Ne	4.810	3.378	4.116	2.568	2.972	4.107	6.164	4.148	3.426	2.946	3.8633
		N _a	8	4	5	3	3	5	6	6	5	3	4.8000
		A _r	8.000	4.000	5.000	3.000	3.000	5.000	6.000	6.000	5.000	3.000	4.8000
HQ	HQ	H _o	0.467	0.267	0.367	0.300	0.267	0.400	0.500	0.433	0.367	0.300	0.3667
		H _e	0.811	0.735	0.791	0.673	0.434	0.801	0.826	0.777	0.710	0.693	0.7250
		F _{IS}	0.462	0.641	0.581	0.648	0.389	0.580	0.434	0.482	0.531	0.656	0.5404
		Ne	4.890	3.607	4.280	2.718	1.744	4.429	5.191	4.174	3.144	2.953	3.7130
		N _a	4	4	4	3	7	5	6	5	6	3	4.7000
		A _r	4.000	4.000	4.000	3.000	7.000	5.000	6.000	5.000	6.000	3.000	4.7000
HMW	HMW	H _o	0.333	0.267	0.367	0.333	0.267	0.367	0.433	0.400	0.333	0.200	0.3300
		H _e	0.715	0.764	0.765	0.502	0.728	0.796	0.743	0.779	0.836	0.675	0.7303
		F _{IS}	0.538	0.696	0.563	0.379	0.716	0.582	0.421	0.572	0.643	0.752	0.5862
		Ne	3.365	3.867	3.921	1.931	3.439	4.450	3.711	3.843	5.391	2.885	3.6802
		N _a	5	3	4	3	3	5	5	5	5	3	4.1000
		A _r	5.000	3.000	4.000	3.000	3.000	5.000	5.000	5.000	5.000	3.000	4.1000
		H _o	0.300	0.267	0.300	0.233	0.267	0.367	0.433	0.367	0.267	0.267	0.3067
		H _e	0.765	0.626	0.615	0.671	0.666	0.796	0.811	0.759	0.728	0.697	0.7133
		F _{IS}	0.650	0.665	0.516	0.701	0.648	0.584	0.506	0.560	0.680	0.656	0.6166
		Ne	3.849	2.497	2.528	2.827	2.780	4.369	4.806	3.797	3.378	2.820	3.375

NA, mean number of alleles per strain; Ar, mean values of allelic richness; Ho, observed heterozygosity; He, expected heterozygosity; Fis, inbreeding coefficient.