Project Update: December 2023

Executive summary of the project

Giant snakeheads of the *Channa marulius* group are the largest snakeheads in Sri Lanka. My previous study identified unexpected species diversity in Sri Lanka comprising possibly three geographically discrete lineages. However, the morphology and genetic data based on the mitochondrial barcoding gene was not congruent. In this project, low coverage illumina genome sequencing methods will be used to understand the population genomics of the Sri Lankan giant snakeheads. This will provide a robust validation of relationships earlier inferred from mitochondrial genetic data and will have significant implications for conservation and management as this species is already listed as Vulnerable.

Work progress

There are three main components in this project:

(1) Fieldwork in Sri Lanka to collect samples of giant snakeheads.
(2) Lab work in Switzerland to extract DNA, carry out genome sequencing, and data analysis.
(3) Community-based conservation awareness.

From these three components:
(1) and **(3)** were partially achieved.
(2) was not achieved yet.

(1) Fieldwork

Sampling was carried out across all the island's climatic zones and major river basins. Sampling sites were selected based on the known geographic distribution of giant snakeheads, based on previous published work and field observations, in addition to locations reported on the internet and social media (Fig. 1). In some parts of the island, giant snakeheads form part of the fisheries bycatch (these fisheries target mainly introduced exotics such as tilapiine cichlids and large carp). At these locations, we obtained samples from fishermen. We also obtained tissue samples from anglers who catch and release these fish. In addition, we used seine and cast nets to sample (and release) giant snakeheads. At 22 sites (Fig. 1), we obtained a 53 fin clip/tissue samples for the *Channa marulius* group (Table 1) and stored them in vials containing 100% ethanol for later whole genome sequencing.

(3) Community-based conservation awareness

One of the objectives of the project was to raise awareness of the conservation needs of Sri Lanka's giant snakeheads. On social media, especially Facebook, there is now an active community of biodiversity enthusiasts in Sri Lanka and an active community of snakehead keepers. I was invited to deliver a public webinar from such an enthusiastic biodiversity group called BEEZ (Base for Enthusiasts of Environment Science and Zoology), the official student club of the Department of Zoology and Environment Science of University of Colombo to address freshwater fish diversity in Sri Lanka. In this webinar I also brought forward the study on the population genomics of the giant snakeheads in Sri Lanka (Fig. 2).

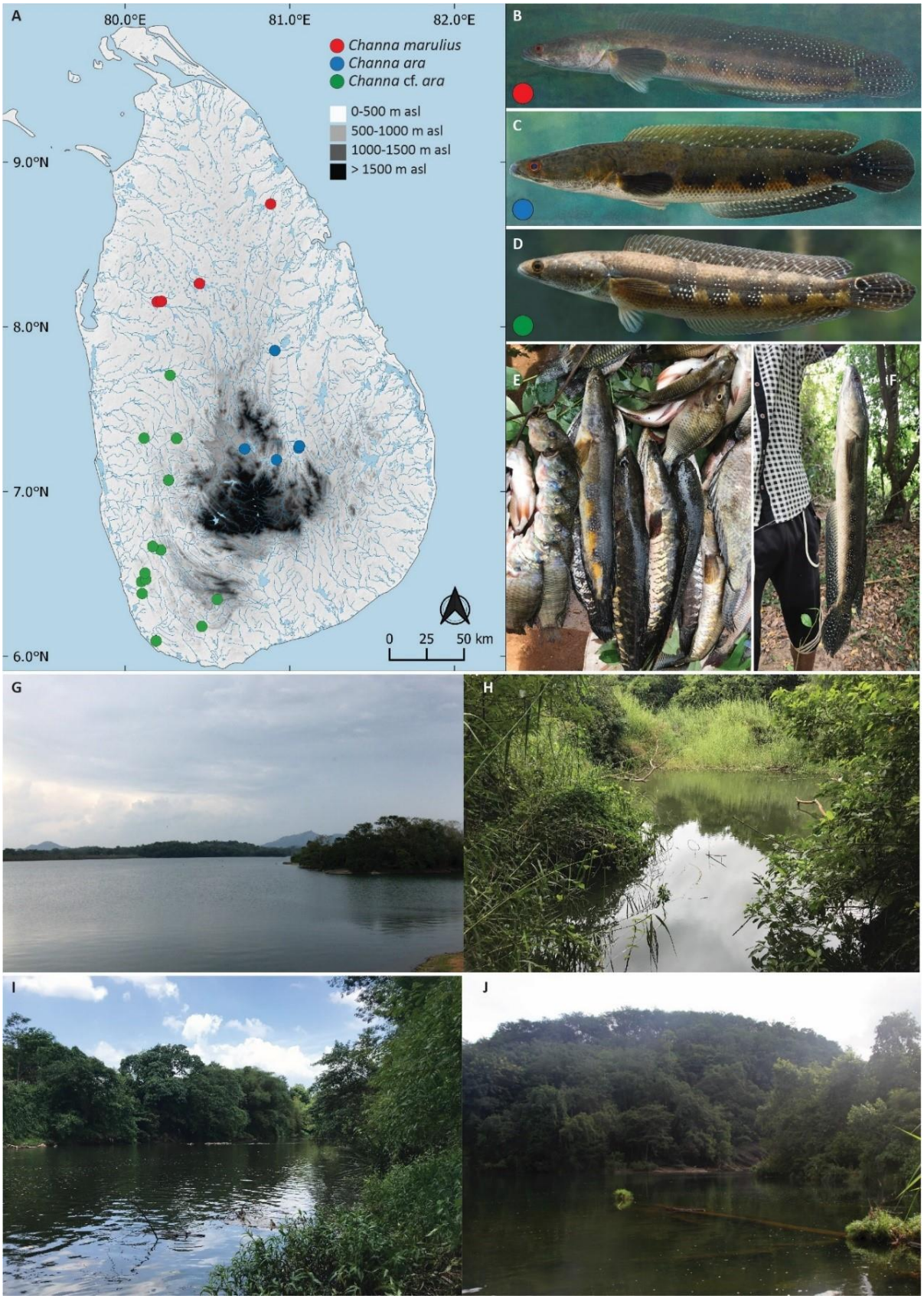

Fig. 1. (A) sampled localities in Sri Lanka for giant snakeheads; **(B)** *Channa marulius* from northern dry zone; **(C)** *Channa ara* from Mahaweli River basin; **(D)** *Channa* cf. *ara* from the southwestern wet zone; **(E)** a specimen of *Channa ara* at a fish market at Loggal Oya; **(F)** a fisherman's catch of a *Channa marulius*; **(G)** Loggal Oya,

Mahaweli basin, habitat for *Channa ara*; **(H)** Nacchaduwa, Malwathu basin, habitat for *Channa marulius*; **(I)** Ruwanwella and **(J)** Yogama, Kelani basin, habitats for *Channa* cf. *ara*.

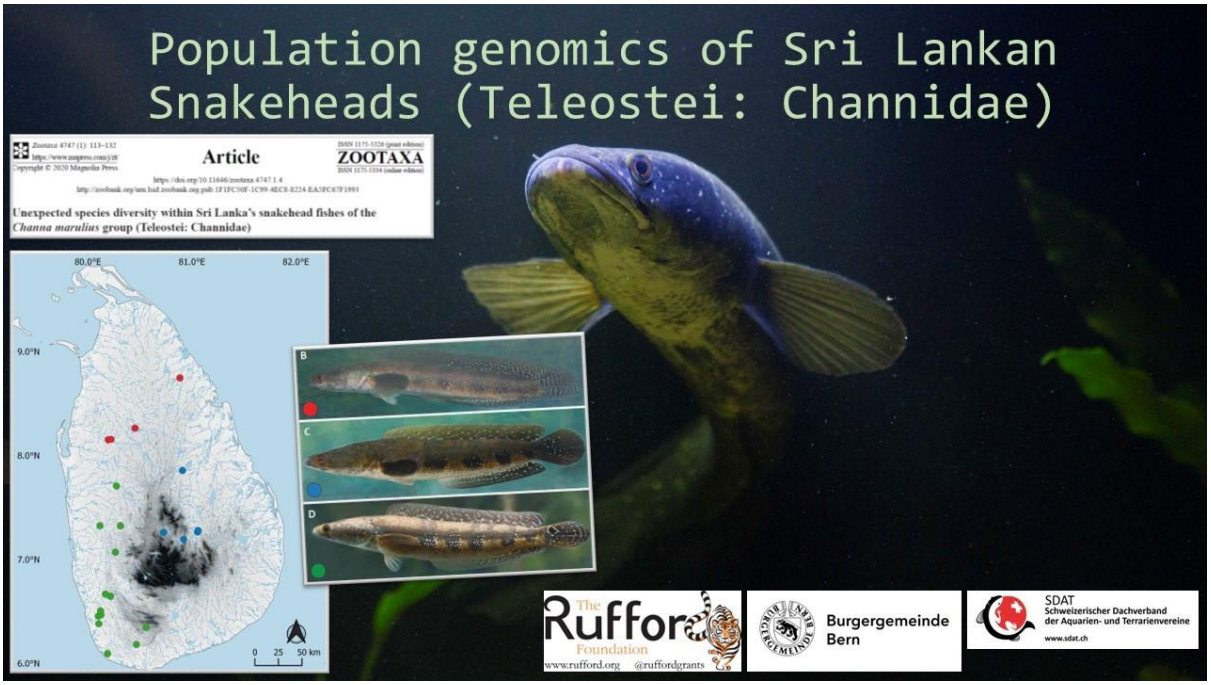

Fig. 2. Presenting on the project on population genomics of Sri Lankan giant snakeheads during a public webinar.

Table 1. Sampled localities for the Channa marulius group during fieldwork in Sri Lanka

Voucher	Genus	Species	Location	River basin	Latitude	Longitude
DZ5646	*Channa*	*ara*	Randenigala	Mahaweli	7.1931	80.9189
DZ3983	*Channa*	*ara*	Victoria Reservoir, Haragama	Mahaweli	7.259	80.726
DZ3983	*Channa*	*ara*	Victoria reservoir, Haragama	Mahaweli	7.259	80.726
DZ4506	*Channa*	*ara*	Haragama, Kandy	Mahaweli	7.259	80.726
DZ5528	*Channa*	*ara*	Loggal Oya	Mahaweli	7.2639	81.0542
DZ5529	*Channa*	*ara*	Loggal Oya	Mahaweli	7.2639	81.0542
DZ5530	*Channa*	*ara*	Loggal Oya	Mahaweli	7.2639	81.0542
DZ5531	*Channa*	*ara*	Loggal Oya	Mahaweli	7.2639	81.0542
DZ5532	*Channa*	*ara*	Loggal Oya	Mahaweli	7.2639	81.0542
DZ5533	*Channa*	*ara*	Loggal Oya	Mahaweli	7.2639	81.0542
DZ5534	*Channa*	*ara*	Loggal Oya	Mahaweli	7.2778	81.0583
DZ5535	*Channa*	*ara*	Loggal Oya	Mahaweli	7.2778	81.0583
DZ5536	*Channa*	*ara*	Loggal Oya	Mahaweli	7.2778	81.0583
DZ5537	*Channa*	*ara*	Loggal Oya	Mahaweli	7.2778	81.0583
DZ4517	*Channa*	*ara*	Angammedilla, Polonnaruwa	Mahaweli	7.855978	80.90928
DZ4548	*Channa*	*ara*	Angammedilla, Polonnaruwa	Mahaweli	7.855978	80.90928
DZ4548	*Channa*	*ara*	Amban River at Angammedilla national park	Mahaweli	7.855978	80.90928
DZ4010	*Channa*	*cf.ara*	Wakwella, Galle	Gin	6.093	80.188
DZ4395	*Channa*	*cf.ara*	Wakwella, Galle	Gin	6.093	80.188
DZ4395	*Channa*	*cf.ara*	Wakwella, Galle	Gin	6.093	80.188
DZ4396	*Channa*	*cf.ara*	Wakwella, Galle	Gin	6.093	80.188
DZ4396	*Channa*	*cf.ara*	Wakwella, Galle	Gin	6.093	80.188
DZ6124	*Channa*	*cf.ara*	Akuressa	Nilwala	6.181578	80.46599
DZ6025	*Channa*	*cf.ara*	Deniyaya	Gin	6.344858	80.55943
DZ5834	*Channa*	*cf.ara*	Ranthotu wila	Bentara	6.3807	80.1036
DZ4330	*Channa*	*cf.ara*	Lewwanduwa, Welipenna	Bentara	6.453	80.099
DZ6022	*Channa*	*cf.ara*	Horawala	Bentara	6.466516	80.12483
DZ6023	*Channa*	*cf.ara*	Horawala	Bentara	6.466516	80.12483
DZ6123	*Channa*	*cf.ara*	Mathugama	Bentara	6.504817	80.12072

DZ3982	*Channa*	*cf.ara*	Niggaha dola, Pahiyangala	Kalu	6.645166	80.21638
DZ4394	*Channa*	*cf.ara*	Agal Oya, Kalutara	Kalu	6.667	80.167
DZ4394	*Channa*	*cf.ara*	Agal Oya	Kalu	6.667	80.167
DZ5218	*Channa*	*cf.ara*	Warawala	Kelani	7.069185	80.26406
DZ5219	*Channa*	*cf.ara*	Warawala	Kelani	7.069185	80.26406
DZ5220	*Channa*	*cf.ara*	Warawala	Kelani	7.069185	80.26406
DZ5221	*Channa*	*cf.ara*	Warawala	Kelani	7.069185	80.26406
DZ5222	*Channa*	*cf.ara*	Warawala	Kelani	7.069185	80.26406
DZ6026	*Channa*	*cf.ara*	Polgahawela	Maa Oya	7.322052	80.3125
DZ6027	*Channa*	*cf.ara*	Polgahawela	Maa Oya	7.322052	80.3125
DZ5224	*Channa*	*cf.ara*	Giriulla	Maa Oya	7.32433	80.11497
DZ5831	*Channa*	*cf.ara*	Deduru Oya Reservoir	Deduru	7.7059	80.2736
DZ5225	*Channa*	*marulius*	Rajanganaya	Kala Oya	8.151426	80.19539
DZ5226	*Channa*	*marulius*	Rajanganaya	Kala Oya	8.151426	80.19539
DZ5227	*Channa*	*marulius*	Rajanganaya	Kala Oya	8.151426	80.19539
DZ4900	*Channa*	*marulius*	Rajanganaya	Kala Oya	8.15507	80.22089
DZ5228	*Channa*	*marulius*	Nachchaduwa	Malwathu Oya	8.263053	80.45194
DZ5229	*Channa*	*marulius*	Nachchaduwa	Malwathu Oya	8.263053	80.45194
DZ5230	*Channa*	*marulius*	Nachchaduwa	Malwathu Oya	8.263053	80.45194
DZ5231	*Channa*	*marulius*	Nachchaduwa	Malwathu Oya	8.263053	80.45194
DZ5232	*Channa*	*marulius*	Nachchaduwa	Malwathu Oya	8.263053	80.45194
DZ5233	*Channa*	*marulius*	Nachchaduwa	Malwathu Oya	8.263053	80.45194
DZ5234	*Channa*	*marulius*	Nachchaduwa	Malwathu Oya	8.263053	80.45194
DZ5237	*Channa*	*marulius*	Yan Oya reservoir	Yan Oya	8.7456	80.8836