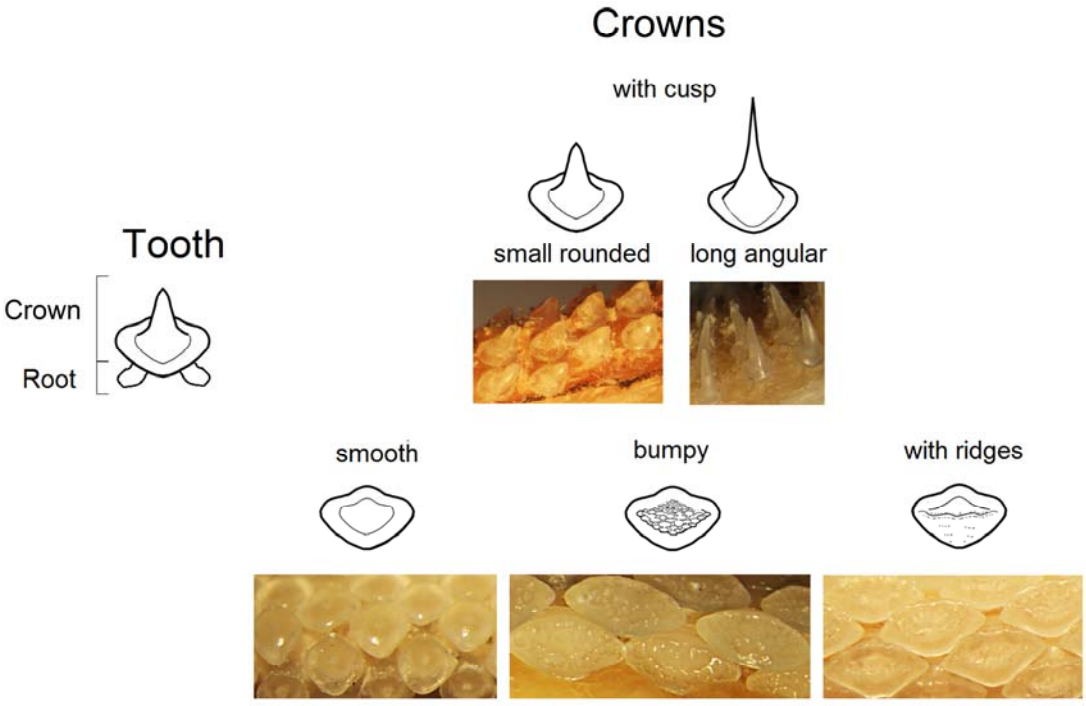
Supplementary material 1 A: maturity size of the species (Mats); source, C: calculated in the present study, FB: from fishbase. B: step by step calculations of the maturity size based on sisters or closely related species. In bold is the species of interest in this study: Sp. Maximum size: Maxs. Percentages of the maturity size on the maximum size: Pi = Mats*(100%)/Maxs. Mean of the Pi: Pi$\overline{x}$. Calculated maturity size: CMats = $\overline{x}$*(Maxs Sp)/100.

A	Mats cm	Source			
Dipturus olseni	35.15	C			
Fenestraja sinusmexicanus	32.25	FB			
Gymnura micrura	42.00	FB			
Hypanus americanus	77.50	FB			
Narcine bancroftii	40.16	C			
Pseudobatus lentiginosus	53.04	C			
Raja ackleyi	35.51	C			
Raja texana	36.91	C			
Urobatis jamaicensis	48.77	C			
B	Maxs cm	Mats cm	Pi %	Pi $\overline{x}$ %	CMats cm
Dipturus olseni	69				
Dipturus gudgeri	184	127	69.02	50.93	35.15
Dipturus innominatus	240	112	46.66		
Dipturus mennii	167	62	37.12		
Narcine bancroftii	65				
Narcine brunnea	22	14	63.63	61.78	40.16
Narcine timlei	38	14	36.84		
Narcinops nelsoni	34.8	19	54.59		
Narcinops nelsoni	31.3	19	60.70		
Narcine oculifera	35	32.5	92.85		
Narcinops westraliensis	29	18	62.06		
Pseudobatus lentiginosus	75				
Pseudobatos productus	119	99	83.19	70.71	53.04
Pseudobatos productus	170	99	58.23		
Raja ackleyi	51				
Rostroraja eglanteria	84	49	58.33	69.63	35.51
Rostroraja eglanteria	84	60	71.42		
Aetomylaeus nichofii	65	39	60		
Aetomylaeus nichofii	65	42	64.61		
Amblyraja hyperborea	112	94	83.92		
Atlantoraja castelnaui	132	105	79.54		
Atlantoraja cyclophora	79	52	65.82		
Atlantoraja cyclophora	79	58	73.41		
Raja texana	53				
Rostroraja eglanteria	84	49	58.33	69.63	36.91
Rostroraja eglanteria	84	60	71.42		
Aetomylaeus nichofii	65	39	60		
Aetomylaeus nichofii	65	42	64.61		
Amblyraja hyperborea	112	94	83.92		
Atlantoraja castelnaui	132	105	79.54		
Atlantoraja cyclophora	79	52	65.82		
Atlantoraja cyclophora	79	58	73.41		
Urobatis jamaicensis	76				
Urobatis halleri	58	24	41.37	64.16	48.77
Urobatis tumbesensis	34.5	30	86.95		

Supplementary material 2 Morphological variation of the tooth crowns.



Supplementary material 3 COI sequences were used to construct a phylogenetic tree. Sequences were obtained from the database BOLDSYSTEM and GenBank. bp: base pair

Database	Code/project	Scientific name	bp	Depository	Collection site	Museum ID
Bold system	UKFBJ683-08	*Dipturus olseni*	648	University of Kansas, Biodiversity Research Center	United States, Texas	KU 30239
GenBank	PRJNA498040	*Gymnura micrura*	655	Fisheries Conservation Lab, Smithsonian	Chesapeake Bay, USA	MT455653
Bold system	MFIV310-10	*Hypanus americanus*	633	El Colegio de la Frontera Sur, Unidad Chetumal	Mexico, Campeche, Champoton	ECOCH
Bold system	CFSAN188-11	*Narcine bancroftii*	655	Smithsonian Institution National Museum of Natural History	United States, Alabama	398334
Bold system	MXIV396-10	*Pseudobatos lentiginosus*	652	El Colegio de la Frontera Sur, Unidad Chetumal	Mexico, Campeche, Carmen	ECOCH6452
Bold system	ANGBF11464-15	*Raja texana*	603	Mined from GenBank, NCBI	United States	KU29665
Bold system	MEFM680-06	*Urobatis jamaicensis*	652	El Colegio de la Frontera Sur, Unidad Chetumal	Mexico, Quintana Roo, Lazaro Cardenas	ECOCH5768

Supplementary material 4 Phylogenetic independent contrasts. Regression results between the morphological and trophic variation. PC: principal component. DSV: Disc-shape ventral view. DSD: Disc-shape dorsal view. MC: Meckel's cartilage. T: tooth morphology. TI: trophic index. *p* values above the diagonal and r values below the diagonal. *p* significant on bold.

	DSV PC1	DSV PC2	DSD PC1	DSD PC2	MC PC1	MC PC2	T PC1	T PC2	TI
DSV PC1		0.790	0.390	0.790	**0.020**	0.560	0.880	0.520	0.630
DSV PC2	0.014		0.850	0.230	0.610	**0.002**	0.340	0.600	0.820
DSD PC1	0.150	0.000		0.990	**0.030**	0.350	0.680	0.840	0.950
DSD PC2	0.015	0.260	0.000		0.560	**0.010**	**0.040**	0.890	0.170
MC PC1	**0.670**	0.050	**0.640**	0.060		0.618	0.490	0.490	0.310
MC PC2	0.070	**0.860**	0.160	**0.720**	0.053		0.510	0.580	**0.005**
T PC1	0.000	0.170	0.030	**0.570**	0.090	0.080		0.51	0.180
T PC2	0.080	0.050	0.000	0.000	0.090	0.006	0.080		0.350
TI	0.040	0.010	0.000	0.330	0.190	**0.810**	0.320	0.170	