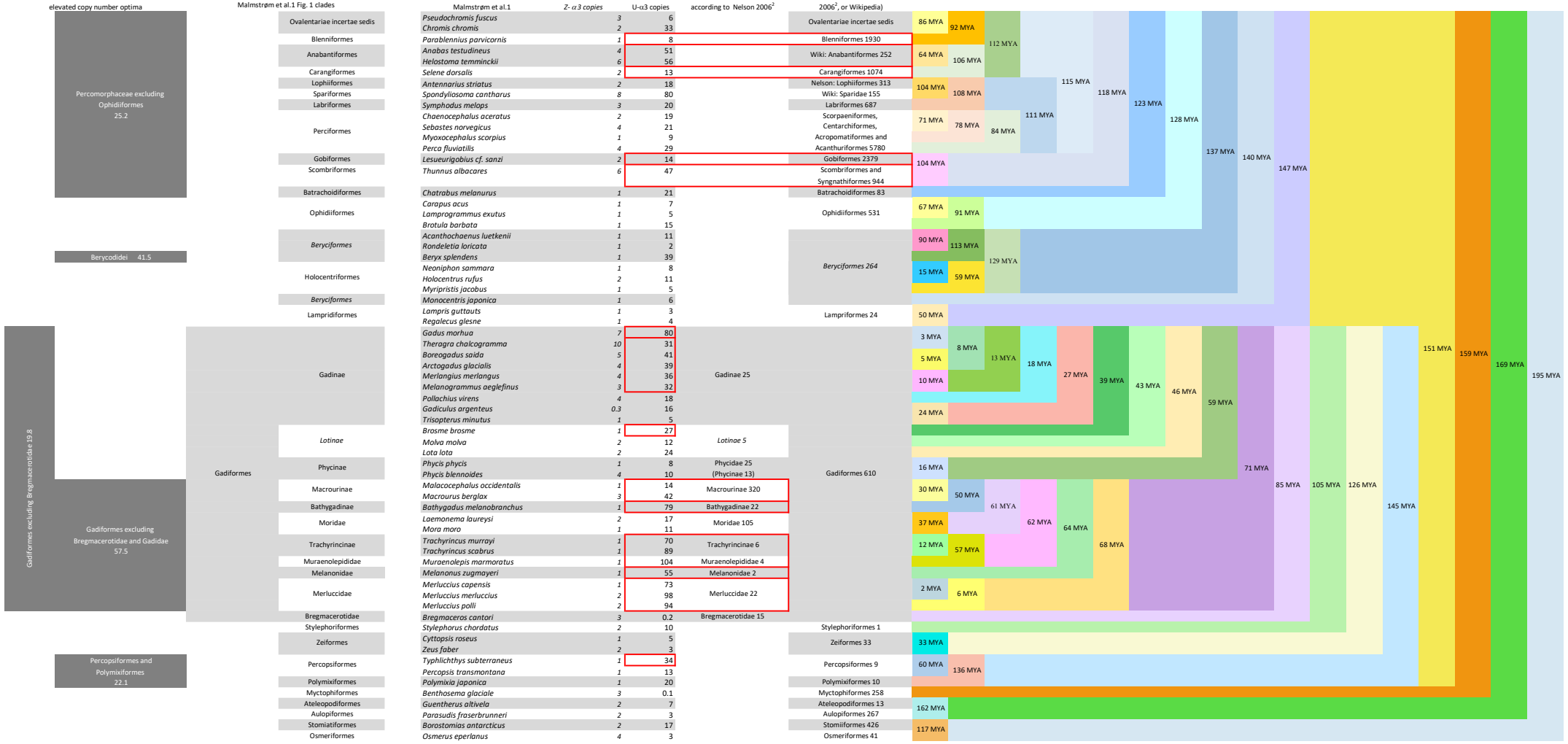
Table S2. Species numbers in teleost clades, and estimated U and Z α3 copy numbers in teleost species, investigated by Malmstrøm and co-workers.

(for the table legend also see next page)

Clades for which Malmstrøm et al.1 calculated elevated copy number optima	Malmstrøm et al.1 Fig. 1 clades	Species investigated by Malmstrøm et al.1	*estimated*[1] *Z- α3 copies*	estimated[1] U-α3 copies	Gadiform species numbers according to Nelson 2006[2]	Species numbers according to Davis *et al.* 2016[3] (or Nelson 2006[2], or Wikipedia)
Percomorphaceae excluding Ophidiiformes 25.2	Ovalentariae incertae sedis	*Pseudochromis fuscus*	3	6		Ovalentariae incertae sedis
		Chromis chromis	2	33		
	Blenniformes	*Parablennius parvicornis*	1	8		Blenniformes 1930
	Anabantiformes	*Anabas testudineus*	4	51		Wiki: Anabantiformes 252
		Helostoma temminckii	6	56		
	Carangiformes	*Selene dorsalis*	2	13		Carangiformes 1074
	Lophiiformes	*Antennarius striatus*	2	18		Nelson: Lophiiformes 313
	Spariformes	*Spondyliosoma cantharus*	8	80		Wiki: Sparidae 155
	Labriformes	*Symphodus melops*	3	20		Labriformes 687
	Perciformes	*Chaenocephalus aceratus*	2	19		Scorpaeniformes, Centarchiformes, Acropomatiformes and Acanthuriformes 5780
		Sebastes norvegicus	4	21		
		Myoxocephalus scorpius	1	9		
		Perca fluviatilis	4	29		
	Gobiformes	*Lesueurigobius cf. sanzi*	2	14		Gobiformes 2379
	Scombriformes	*Thunnus albacares*	6	47		Scombriformes and Syngnathiformes 944
	Batrachoidiformes	*Chatrabus melanurus*	1	21		Batrachoidiformes 83
	Ophidiiformes	*Carapus acus*	1	7		Ophidiiformes 531
		Lamprogrammus exutus	1	5		
		Brotula barbata	1	15		
Berycodidei 41.5	*Beryciformes*	*Acanthochaenus luetkenii*	1	11		*Beryciformes 264*
		Rondeletia loricata	1	2		
		Beryx splendens	1	39		
	Holocentriformes	*Neoniphon sammara*	1	8		
		Holocentrus rufus	2	11		
		Myripristis jacobus	1	5		
	Beryciformes	*Monocentris japonica*	1	6		
	Lampridiformes	*Lampris guttauts*	1	3		Lampriformes 24
		Regalecus glesne	1	4		
Gadiformes excluding Bregmacerotidae and Gadidae 57.5	Gadiformes	*Gadus morhua*	7	80		Gadiformes 610
	Gadinae	*Theragra chalcogramma*	10	31		
		Boreogadus saida	5	41		
		Arctogadus glacialis	4	39		
		Merlangius merlangus	4	36	Gadinae 25	
		Melanogrammus aeglefinus	3	32		
		Pollachius virens	4	18		
		Gadiculus argenteus	0.3	16		
		Trisopterus minutus	1	5		
	Lotinae	*Brosme brosme*	1	27		
		Molva molva	2	12	*Lotinae 5*	
		Lota lota	2	24		
	Phycinae	*Phycis phycis*	1	8	Phycidae 25 (Phycinae 13)	
		Phycis blennoides	4	10		
	Macrourinae	*Malacocephalus occidentalis*	1	14	Macrourinae 320	
		Macrourus berglax	3	42		
	Bathygadinae	*Bathygadus melanobranchus*	1	79	Bathygadinae 22	
	Moridae	*Laemonema laureysi*	2	17	Moridae 105	
		Mora moro	1	11		
	Trachyrincinae	*Trachyrincus murrayi*	1	70	Trachyrincinae 6	
		Trachyrincus scabrus	1	89		
	Muraenolepididae	*Muraenolepis marmoratus*	1	104	Muraenolepididae 4	
	Melanonidae	*Melanonus zugmayeri*	1	55	Melanonidae 2	
	Merluccidae	*Merluccius capensis*	1	73	Merluccidae 22	
		Merluccius merluccius	2	98		
		Merluccius polli	2	94		
	Bregmacerotidae	*Bregmaceros cantori*	3	0.2	Bregmacerotidae 15	
	Stylephoriformes	*Stylephorus chordatus*	2	10		Stylephoriformes 1
	Zeiformes	*Cyttopsis roseus*	1	5		Zeiformes 33
		Zeus faber	2	3		
Percopsiformes and Polymixiformes 22.1	Percopsiformes	*Typhlichthys subterraneus*	1	34		Percopsiformes 9
		Percopsis transmontana	1	13		
	Polymixiformes	*Polymixia japonica*	1	20		Polymixiformes 10
	Myctophiformes	*Benthosema glaciale*	3	0.1		Myctophiformes 258
	Ateleopodiformes	*Guentheris altivela*	2	7		Ateleopodiformes 13
	Aulopiformes	*Parasudis fraserbrunneri*	2	3		Aulopiformes 267
	Stomiatiformes	*Borostomias antarcticus*	2	17		Stomiiformes 426
	Osmeriformes	*Osmerus eperlanus*	4	3		Osmeriformes 41



How this Table is organized:

In the columns at the far left, the dark gray shading with white font highlights the clades for which Malmstrøm et al.1 concluded elevated copy number optima, with the numbers indicating the optimum U+Z a3 values as listed in Malmstrøm et al.1 Fig. 3.

In the second set of columns, with the title "Malmstrøm et al.1 Fig. 1 clades", it shows the lowest level of clades, and also the Gadiformes clade, distinguished by Malmstrøm et al.1 in their Fig. 1. White or gray coloring of blocks only serves easier visibility. Beryciformes and Lotinae may not form proper phylogenetic clades.

The colum "Species investigated by Malmstrøm et al.1" lists the 66 species that Malmstrøm et al.1 investigated.

At the far right, the colored fields, which are not in proper ratios, represent the phylogeny and time scale (MYA=million years ago) which Malmstrøm et al.1 assigned to the separations of the investigated clades and species in their Fig. 1 and Supplementary Table 5.

The columns "estimated1 Z-a3 copies" and "estimated1 U-a3 copies" indicates the number of Z and U lineage a3 copies per species as listed in Malmstrøm et al.1 Supplementary Table 3.

The column "Gadiform species numbers according to Nelson 2006[2]" indicates the number of species per gadiform clade as indicated in the book by Nelson 2006[2].

The column "Species numbers according to Davis *et al.* 2016[3] (or Nelson 2006[2], or Wikipedia)" indicates the number of species per clade following Davis et al. 2016[3], or, if Davis *et al.* 2016[3] did not provide the information, by Nelson 2006[2] or Wikipedia (Wiki).

Red boxes highlight examples of situations which do not agree with the concept that abundant species are associated with high estimated numbers of U-α3 copies; the Z copy numbers are not included, since their limited number probably does not make a real difference, and conceptually the combination of U and Z is wrong (see main text).

What this table intends to show:
The choice of clades selected in the OU model by Malmstrøm et al.1 as regimes with elevated copy number optima seems quite arbitraily, and many other branchings do not agree with the concept that abundant species are associated with high estimated numbers of U+Z a3 copies.
The red boxes highlight that:
Blenniformes have many species, but *Parablennius parvicorni* s has only an estimated 8 U-α3 copies.
There are many more species in Carangiformes than in its sisterclade Anabantiformes, but in Anabantiformes the estimated U-α3 copy numbers are much higher than in Canabantiformes.
There are many more species in Gobiformes than in its sisterclade Scombriformes plus Syngnathiformes, but in the latter the estimated U-α3 copy numbers are much higher.
The very high U-α3 number in several Gadiformes, like for example in *Gadus morhua* , does not agree with the species-richness of Gadiformes, which with only 610 species is only modest for a >86 million year old teleost lineage.
Brosme brosme belongs to a very species-poor lineage, but nevertheless has an estimated 27 U-α3 copies.
There are many more species in Macrourinae than in its sisterclade Bathygadinae, but in the latter the estimated U-α3 copy numbers are much higher.
There are many more species in Macrourinae plus Bathygadinae plus Moridae than in the sister clade Trachyrincinae plus Muraenolepididae, but, on average, in the latter the estimated U-α3 copy numbers are much higher.
For representing the offspring of a 55 million year old lineage, Melanonidae has very few species, but nevertheless has a very high estimated U-α3 copy number.
For representing the offspring of a 138 million year old lineage, Percopsiformes has very few species, but nevertheless *Typhlichthys subterraneus* has a very high estimated U-α3 copy number.

References used in this supplementary table
1) Malmstrøm M, Matschiner M, Tørresen OK, Star B, Snipen LG, Hansen TF, Baalsrud HT, Nederbragt AJ, Hanel R, Salzburger W, Stenseth NC, Jakobsen KS, Jentoft S: Evolution of the immune system influences speciation rates in teleost fishes. *Nat Genet.* 2016; 48(10):1204-10.
2) Nelson JS: Fishes of the World. Fourth Edition. John Wiley & Sons, Inc., Hoboken, New Jersey.
3) Davis MP, Sparks JS, Smith WL: Repeated and Widespread Evolution of Bioluminescence in Marine Fishes. *PLoS One.* 2016; 11(6):e0155154.