

Pacific lamprey: Some ecological and biological features during their sea life and relationships with host species



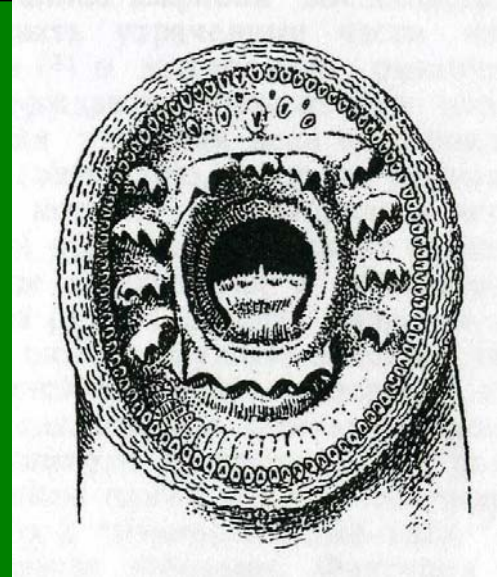
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Pacific lamprey (Eng.)
***Lampetra tridentata* (Lat.)**

Anadromous

Parasitic



Depths 0-1485 m

Total length up to 85 cm

Body weight up to 900 g



The range of Pacific lamprey in the North Pacific



MATERIALS :

Distribution and biology

Survey databases of TINRO-Center (Vladivostok, Russia), Alaska Fisheries Science Center (Seattle, USA), VNIRO (Moscow, Russia), ChukotNIRO (Anadyr, Russia) for the period 1975-2007.

Totally data on 3832 captures are analysed, including those 3818 with depth indication, of which 3118 were within water column (midwater trawl) and 700 off the ground (bottom trawl). Total length of 725 lampreys were measured to analyze their size composition, 332 specimens were measured and weighed to study length-weight relationship.

Parasitism

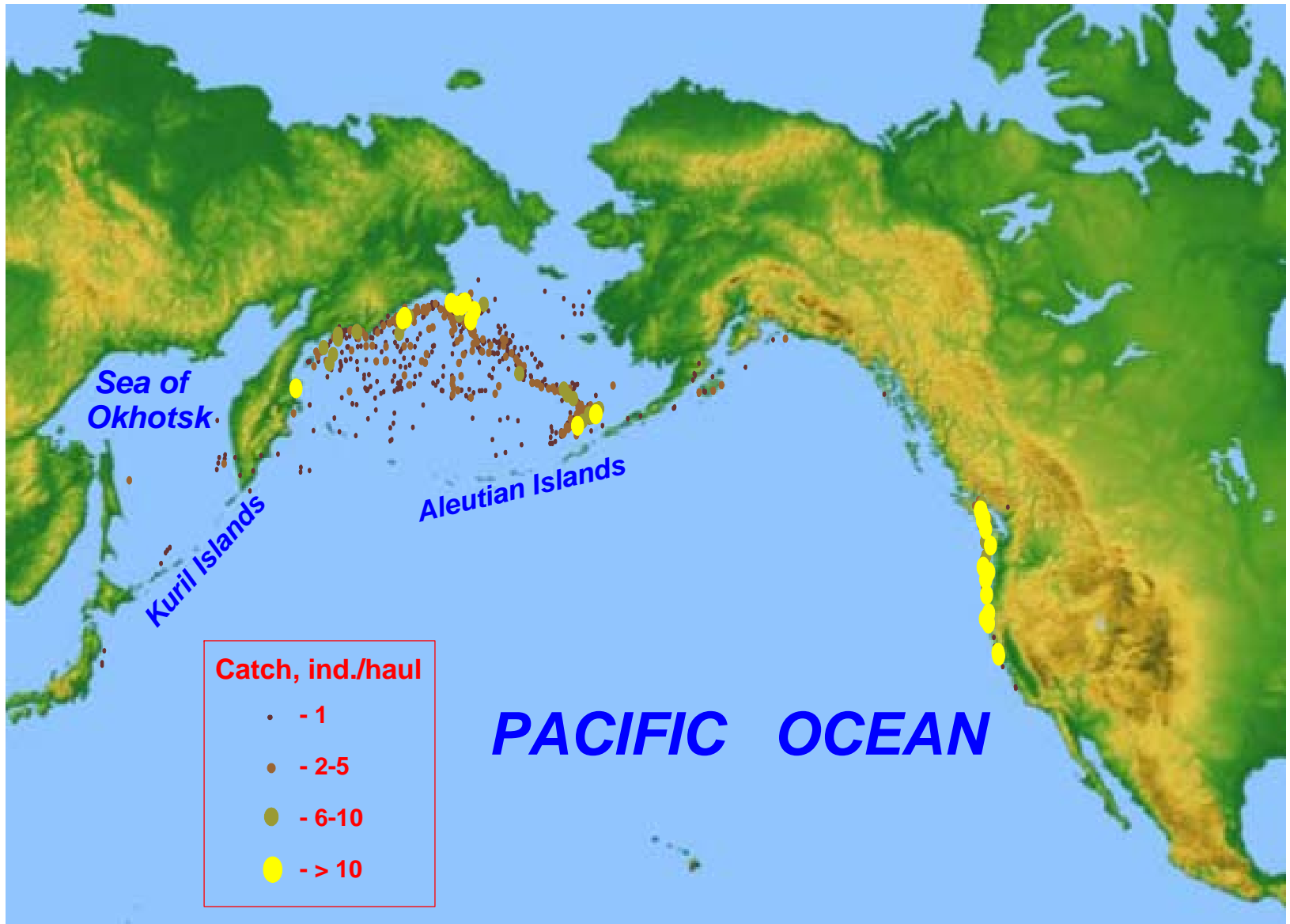
Pacific lamprey marks of 664 host belonging to 10 species were analyzed : walleye pollock – 302, Pacific cod – 118, Greenland halibut – 76, chum salmon – 43, sockeye salmon – 38, Pacific herring – 30, chinook salmon – 19, Pacific halibut – 14, arrowtooth flounder – 14, Kamchatka flounder – 10.

METHODS:

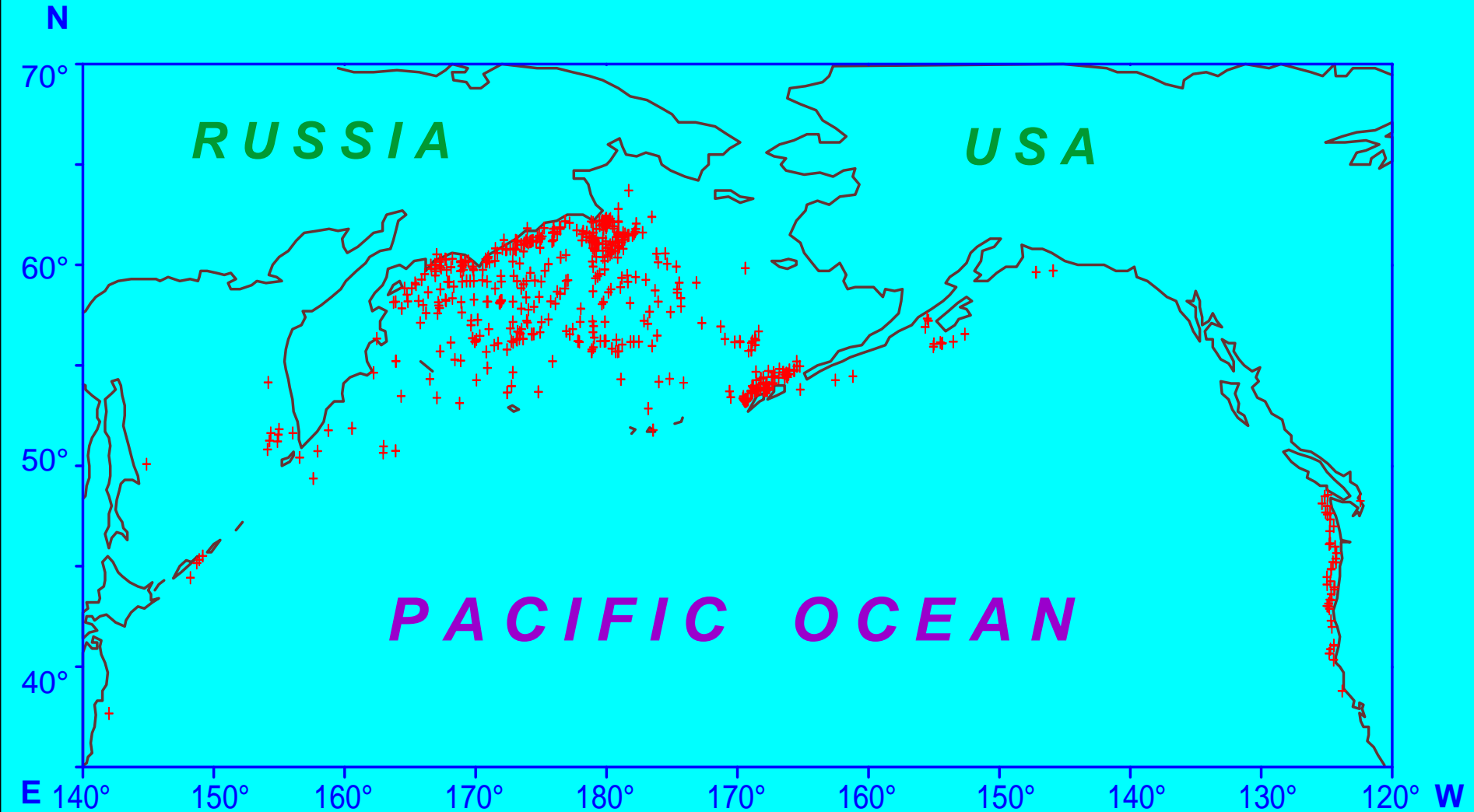
Methods of research were published in two papers:

1. Orlov A.M., Vinnikov A.V., Pelenev D.V. 2007. Principles of studies of the sea period of anadromous parasitic lampreys (example of Pacific lamprey *Lampetra tridentata* (Gairdner, 1836) Petromyzontidae family) // Voprosy Rybolovstva 8 (2): 287-312.
2. Orlov A.M., Savinykh V.F., Pelenev D.V. 2008. Features of spatial distribution and size composition of Pacific lamprey *Lampetra tridentata* in the North Pacific // Russian Journal of Marine Biology 34 (5): 276-287.

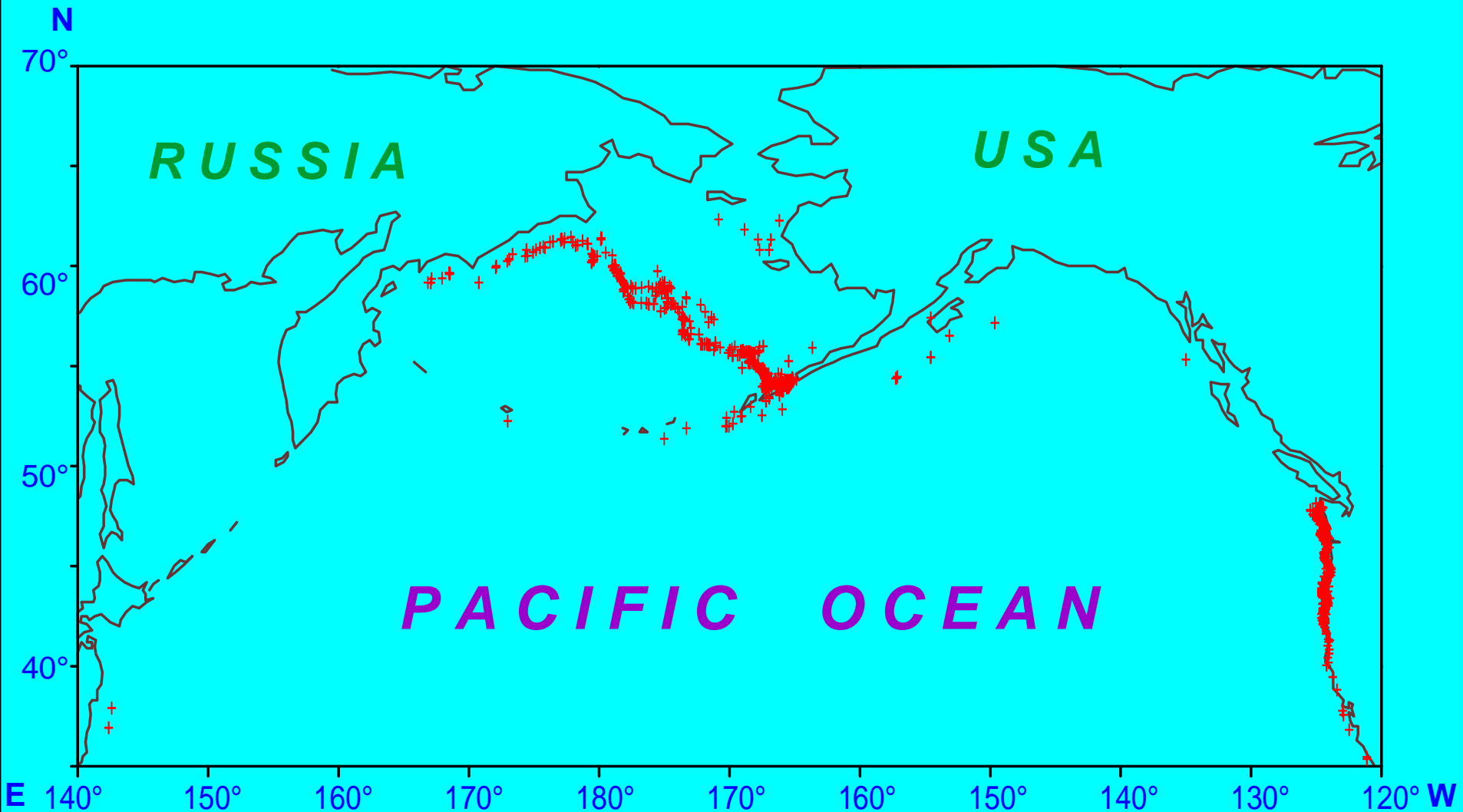
Distribution of Pacific lamprey catches in the North Pacific by bottom and midwater trawls



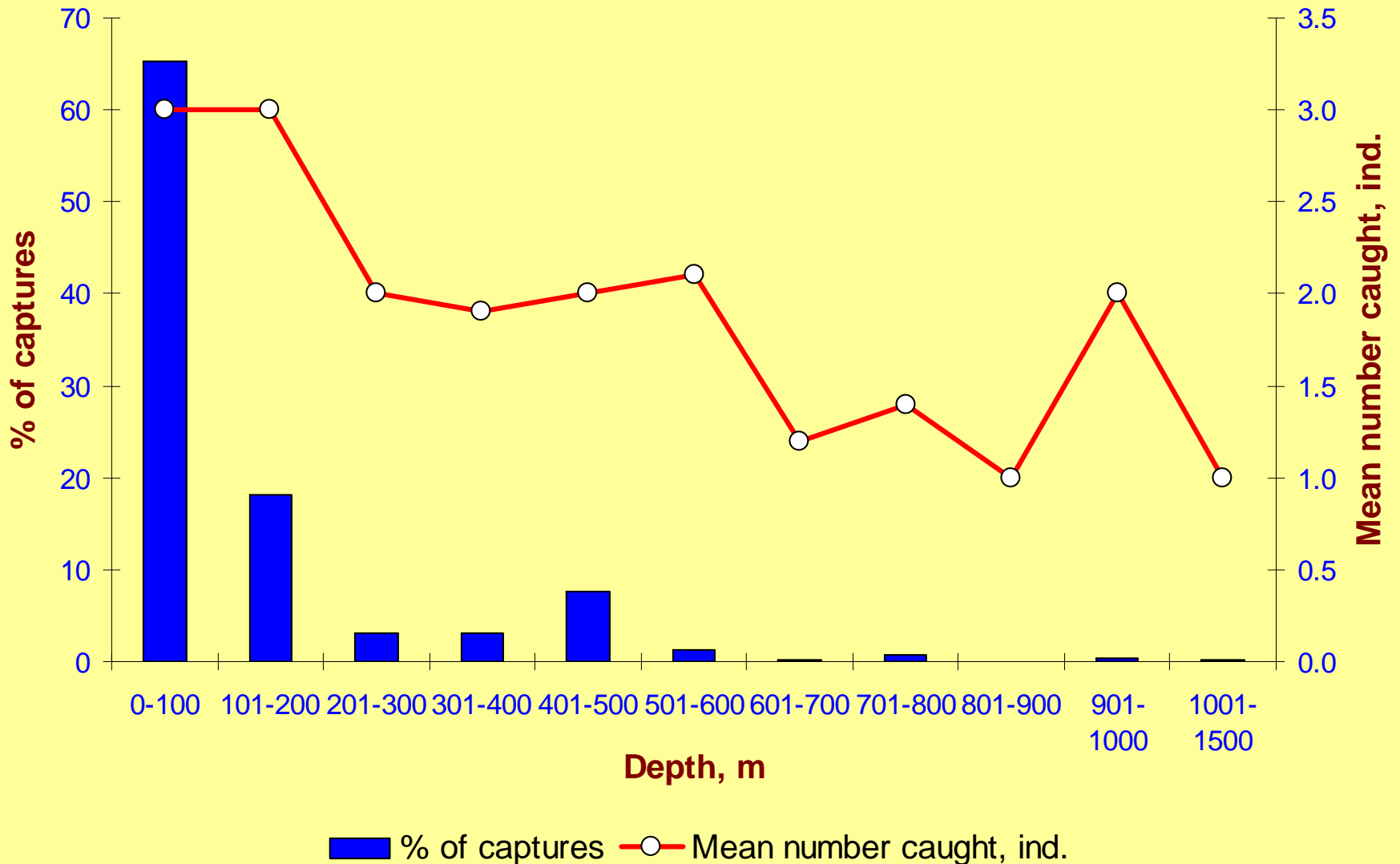
Capture sites of Pacific lamprey in the North Pacific by midwater trawls



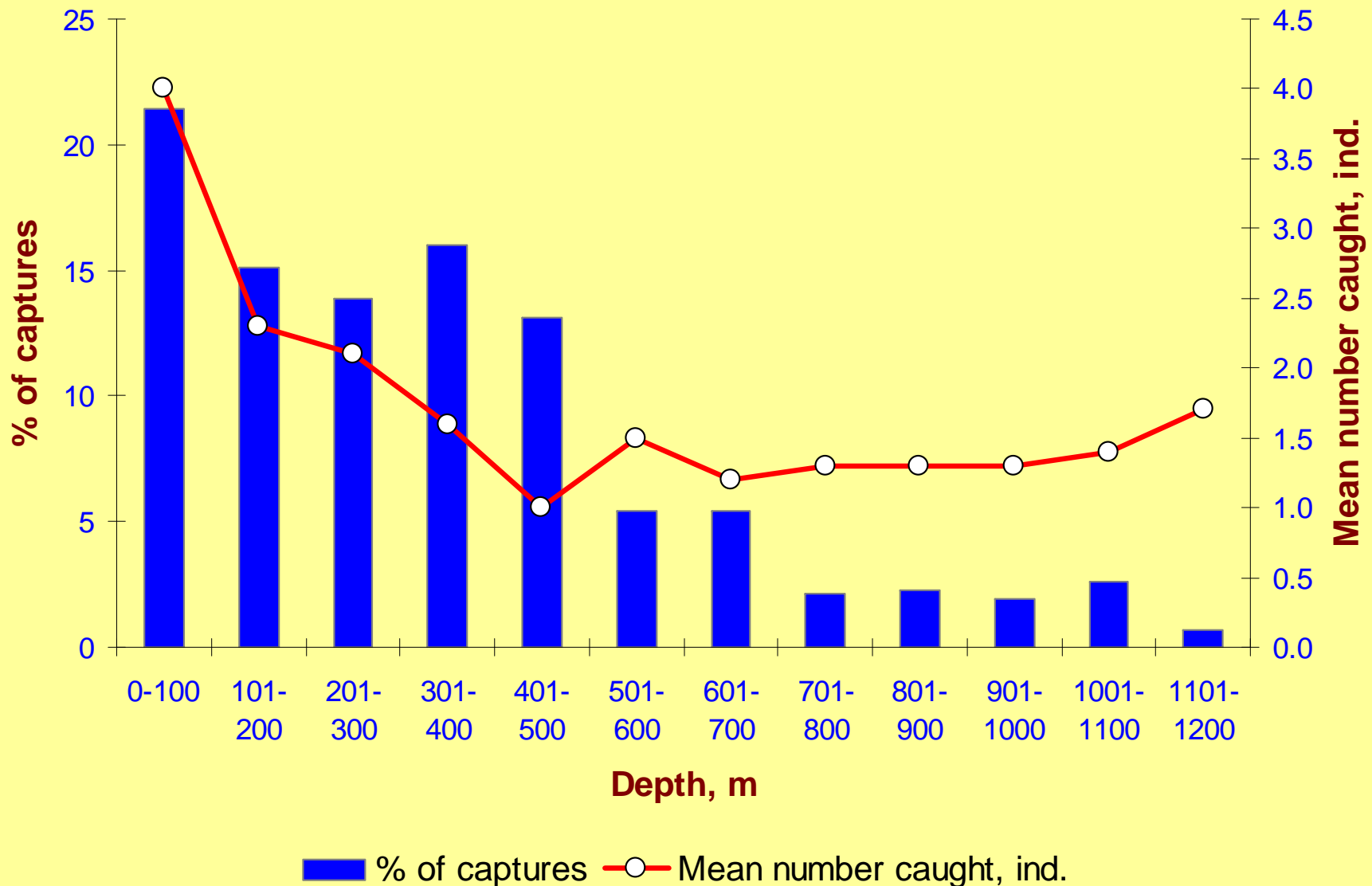
Capture sites of Pacific lamprey in the North Pacific by bottom trawls



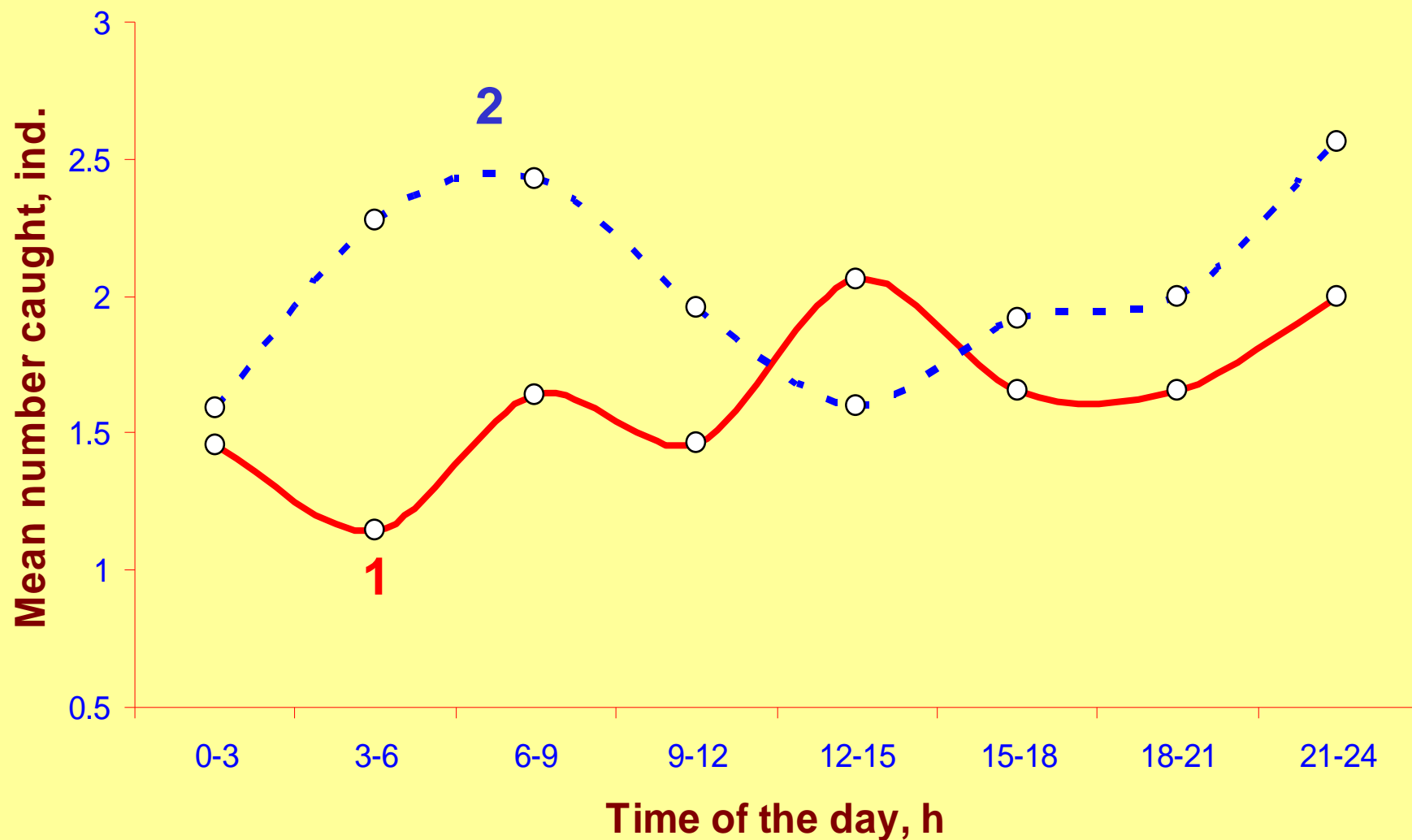
Vertical distribution of Pacific lamprey in the North Pacific according to data obtained by midwater trawls



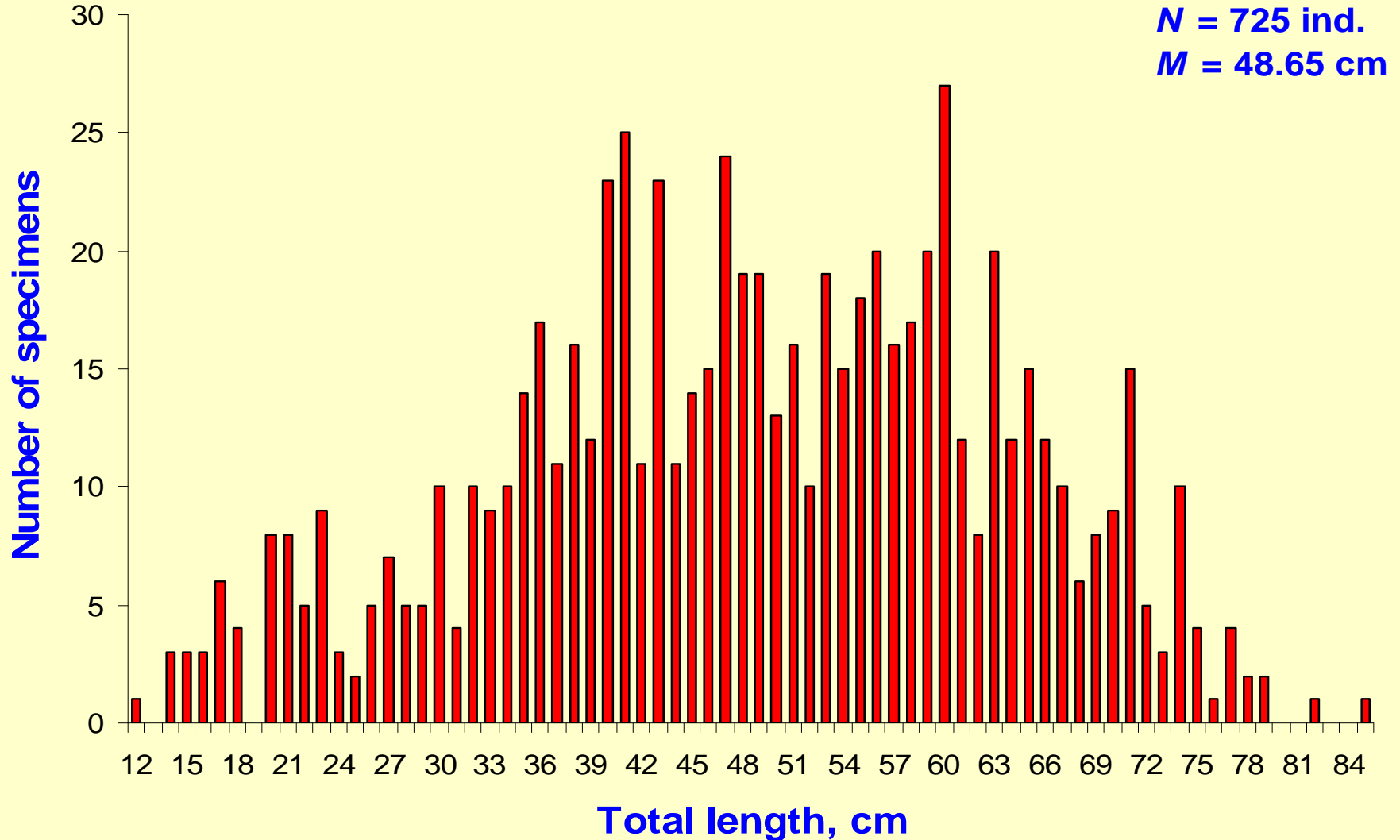
Vertical distribution of Pacific lamprey in the North Pacific according to data obtained by bottom trawls



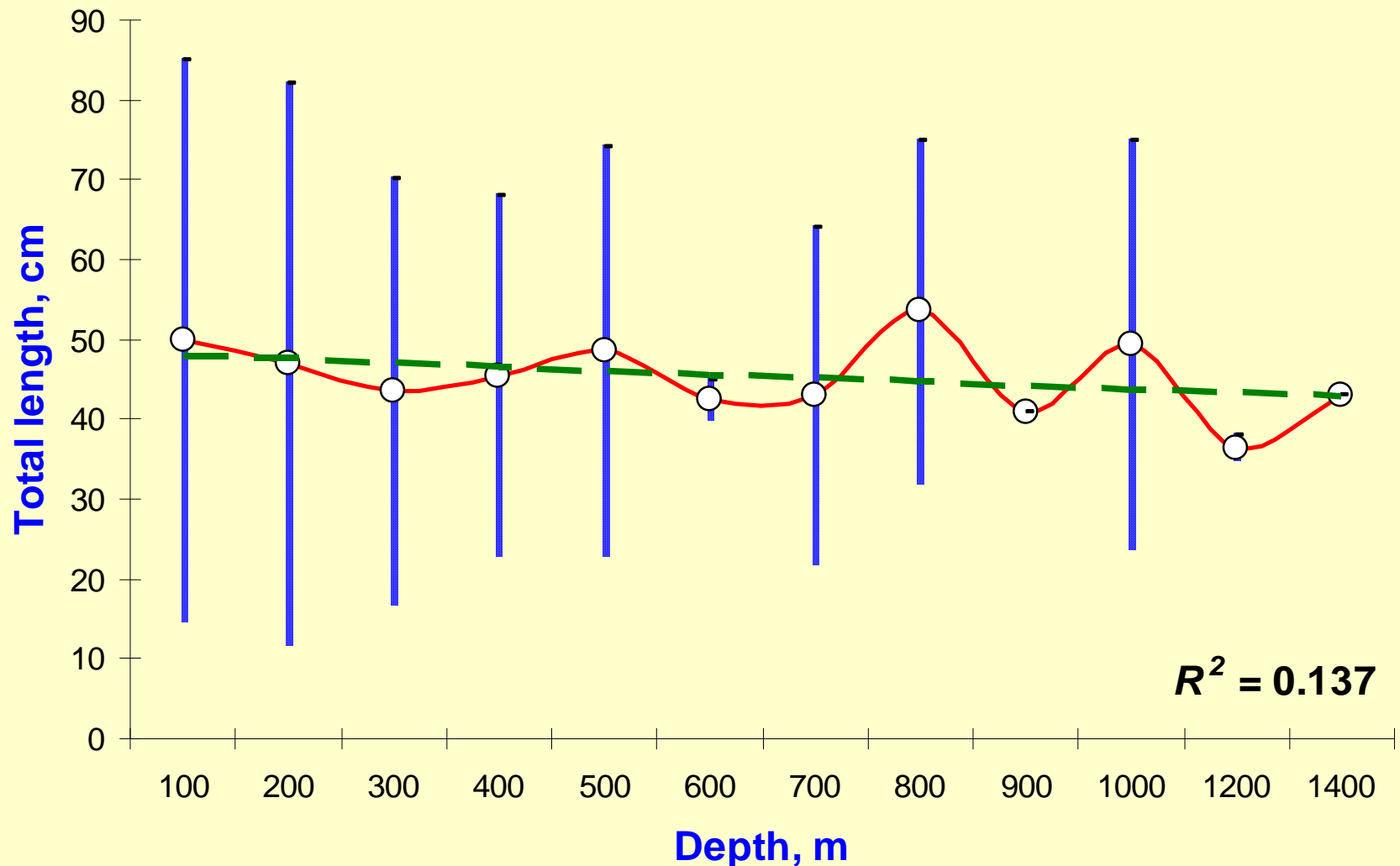
Daily dynamics of Pacific lamprey catch off the bottom (1) and in water column (2) in the North Pacific



Size composition of Pacific lamprey in the North Pacific



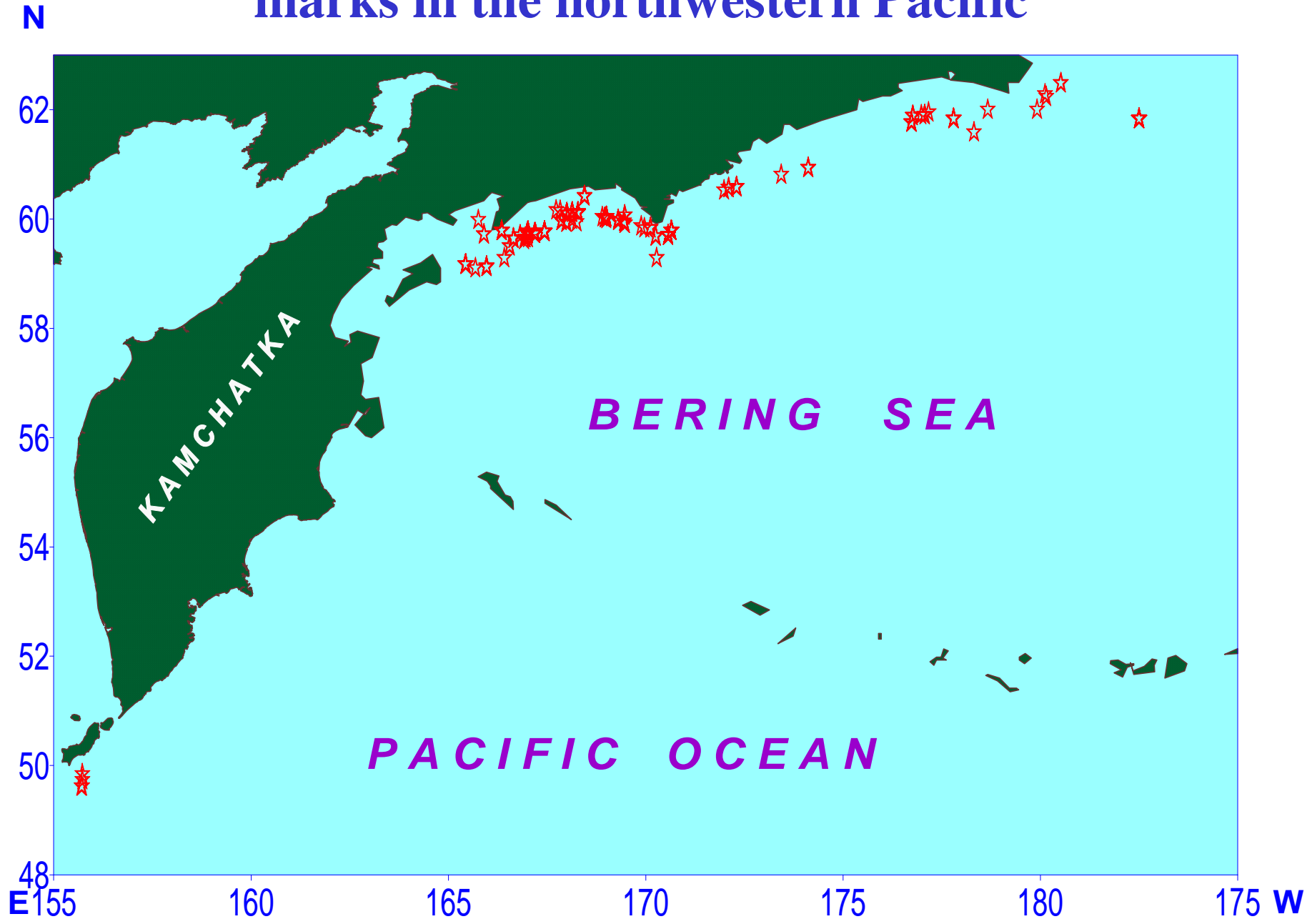
**Total length of Pacific lamprey at different depth
in the North Pacific (vertical bars – variations, red line –
mean values, green dashed line – trend)**



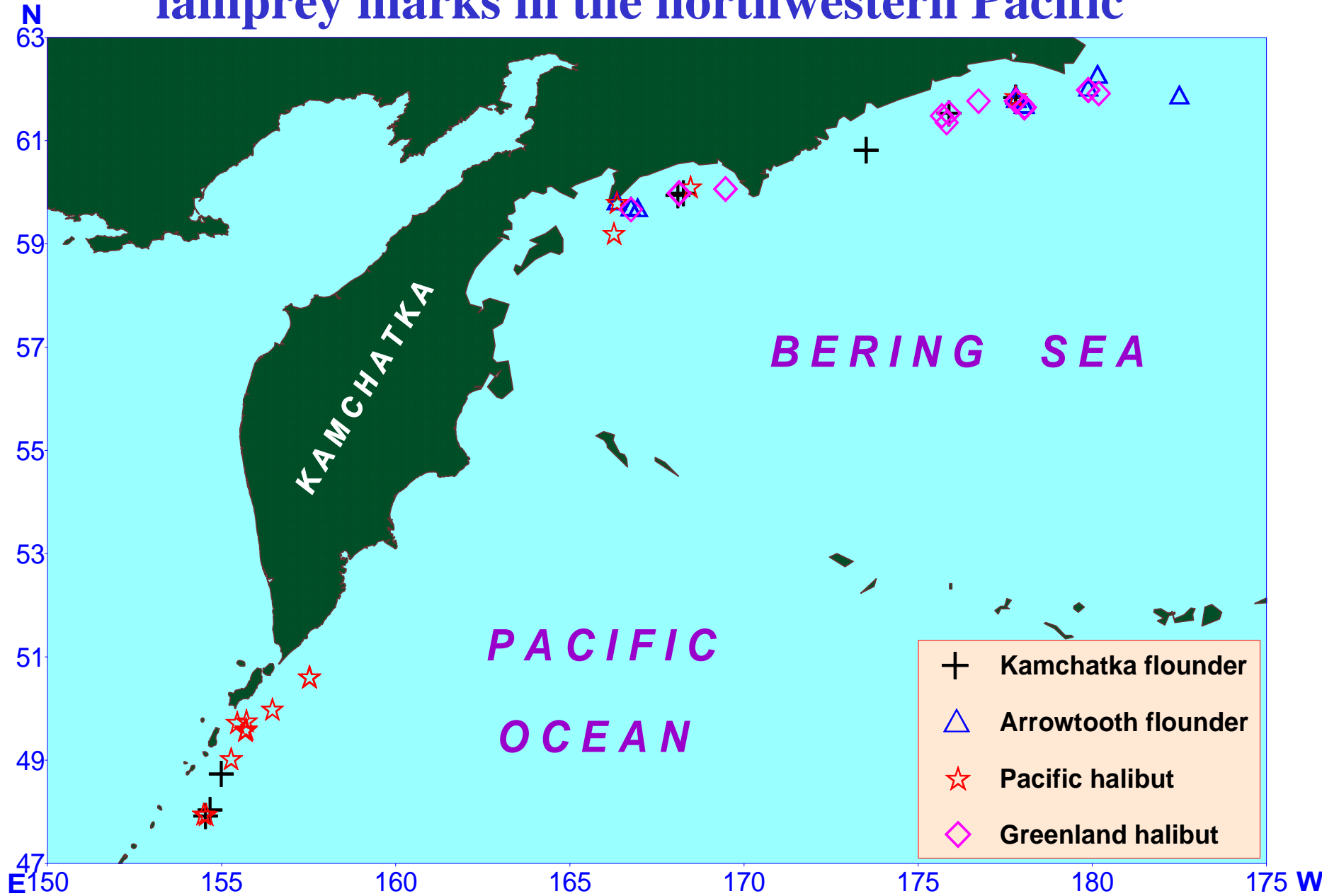
**Total length of Pacific lamprey
in the North Pacific in different months (vertical bars –
variations, red line – mean values, green dashed line – trend)**



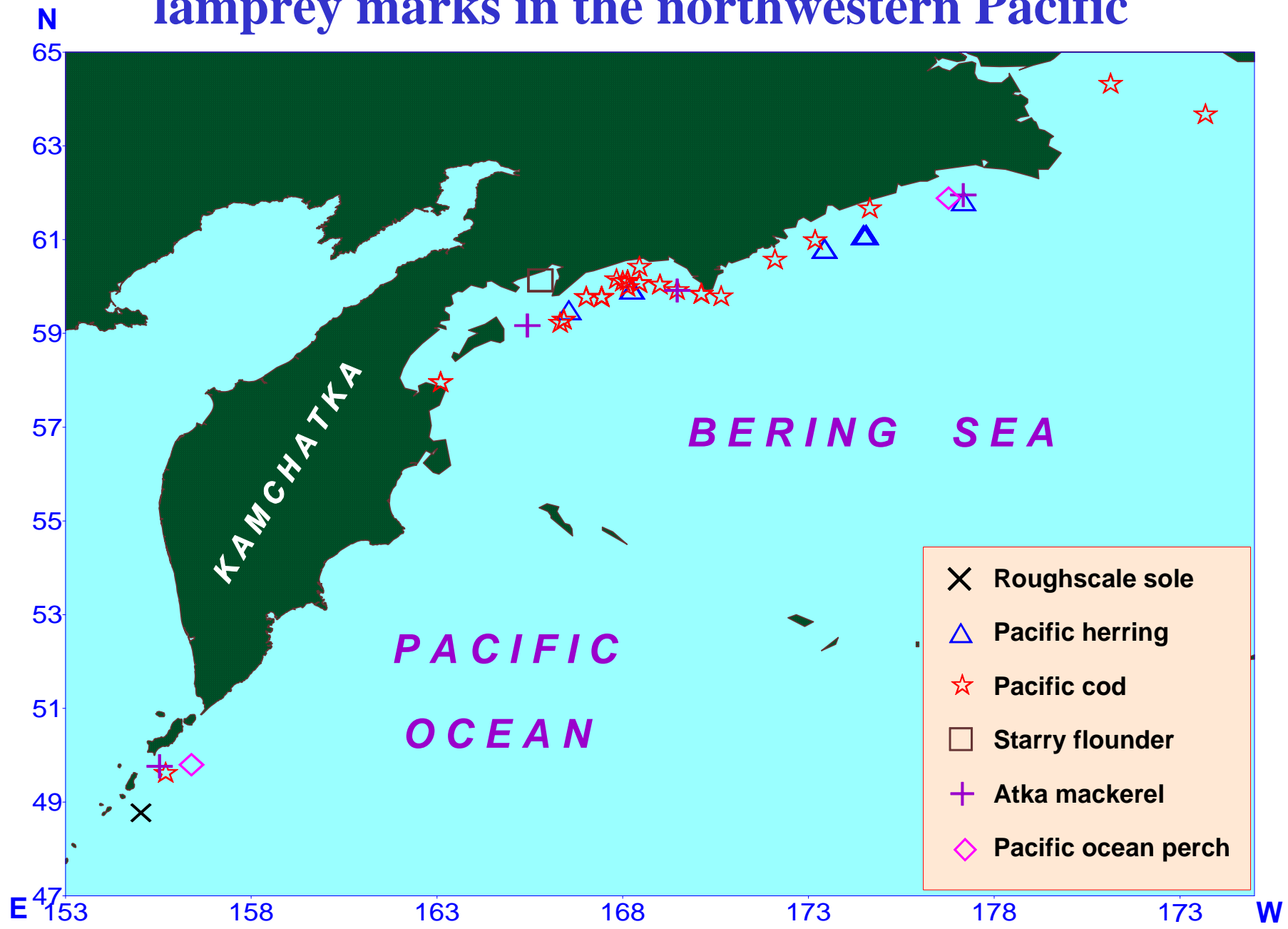
Capture sites of walleye pollock with Pacific lamprey marks in the northwestern Pacific



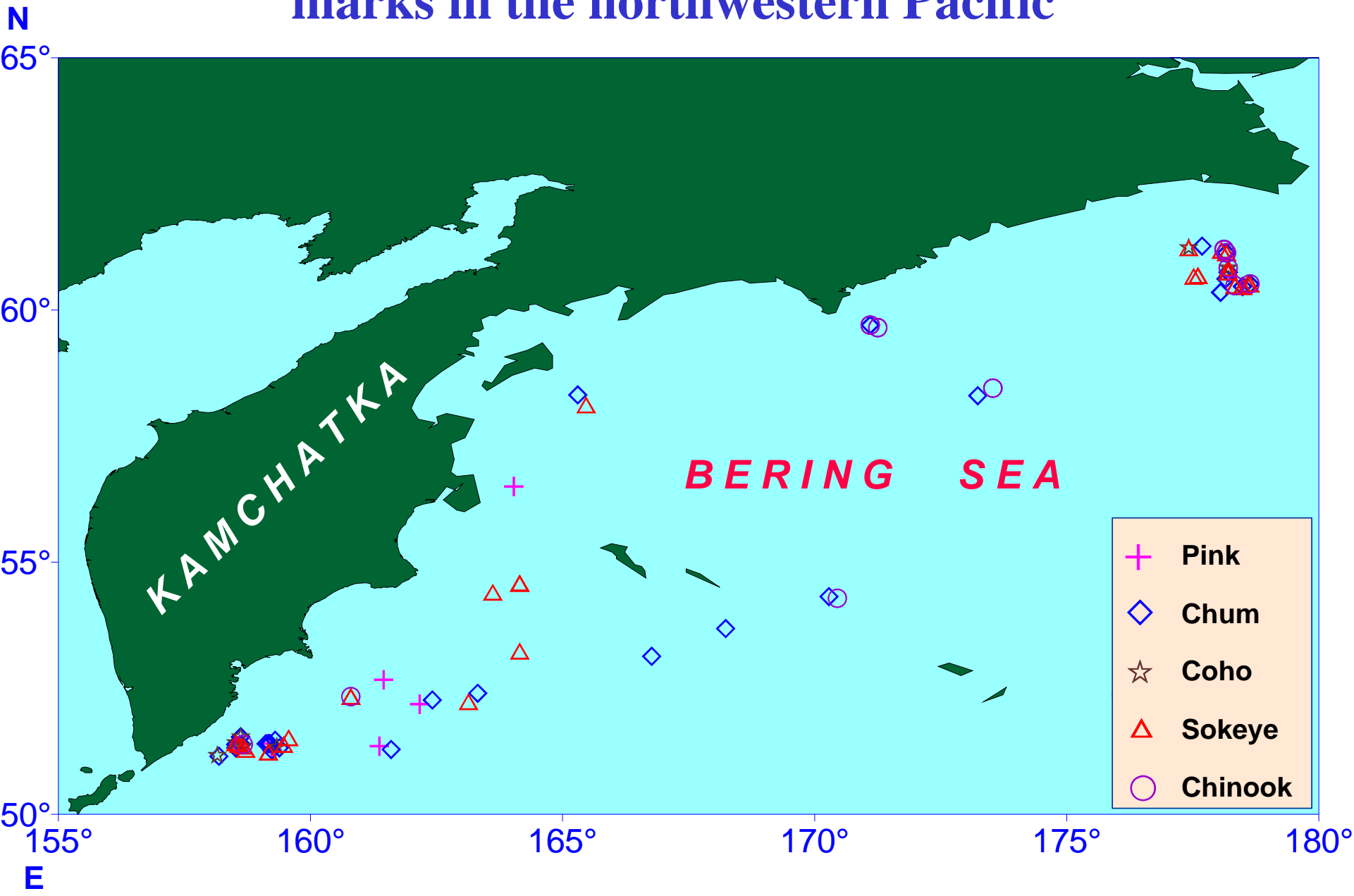
Capture sites of halibuts and flounders with Pacific lamprey marks in the northwestern Pacific



Capture sites of other groundfishes with Pacific lamprey marks in the northwestern Pacific



Capture sites of Pacific salmon with Pacific lamprey marks in the northwestern Pacific



Selectivity of Pacific lamprey in relation to different species

Host species

Salmons



Halibuts



Cod fishes



Greenlings



Herring



Rockfishes



Avoided species

Skates and flounders



Sculpins and poachers



Eelpouts



Snailfishes and grenadiers



Possible causes

of avoidance

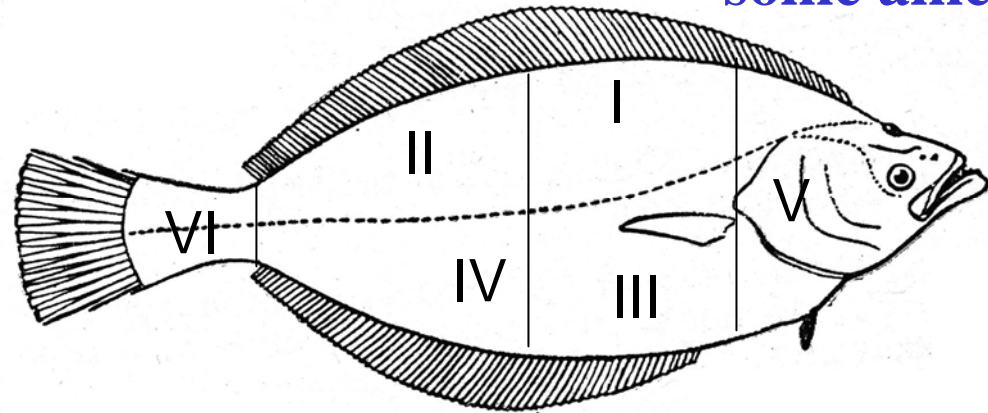
Bottom dwelling
and masking

Small size and
armored body

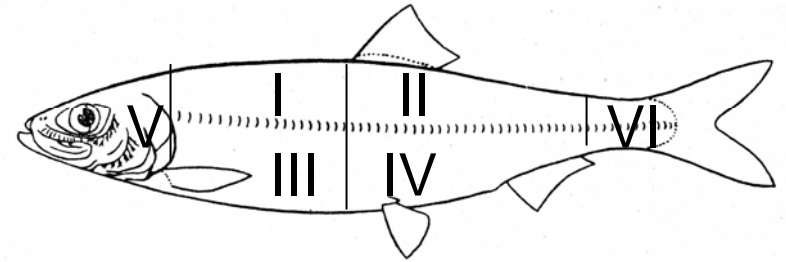
Eel-like shape
and slime skin

Too much water
in flesh

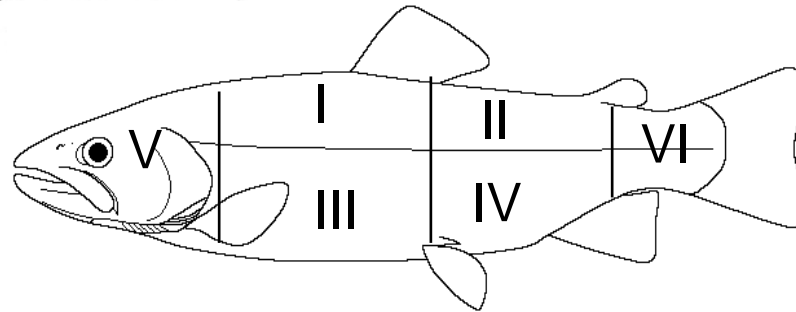
**Division of body surface of Pacific lamprey hosts
to characterize position of marks (after Lennon, 1954 with
some amendments)**



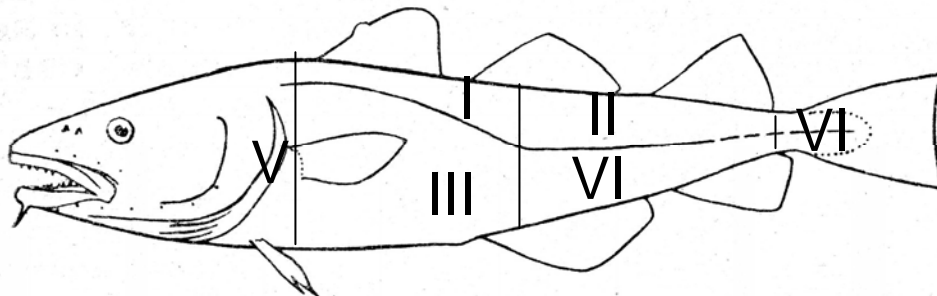
Flatfishes



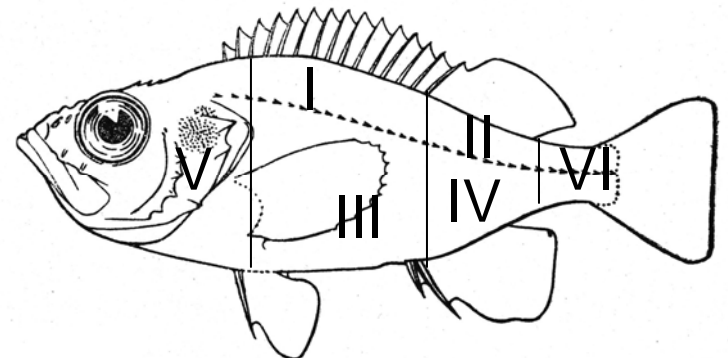
Herring



Salmons



Codfishes

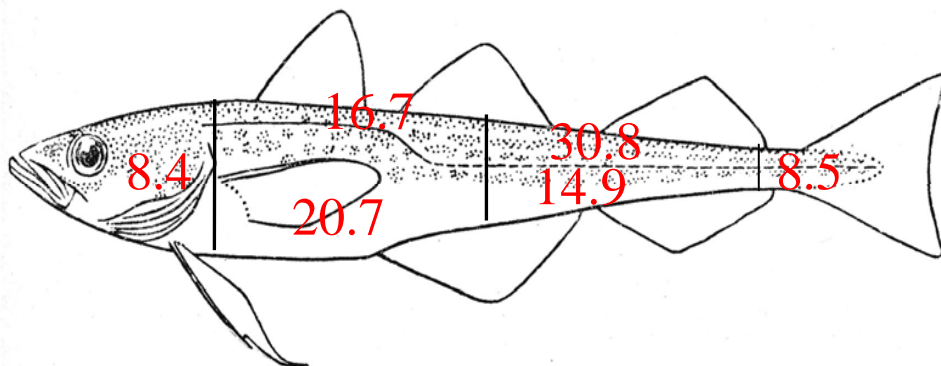


Rockfishes and greenlings

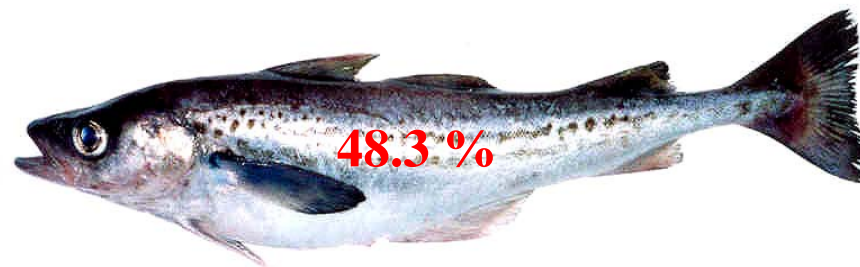
Walleye pollock (302 specimens)



Number of marks 1 – 3 (mean 1.1); Single marks – 80.8%



♂ : ♀ = 42.8 : 57.2

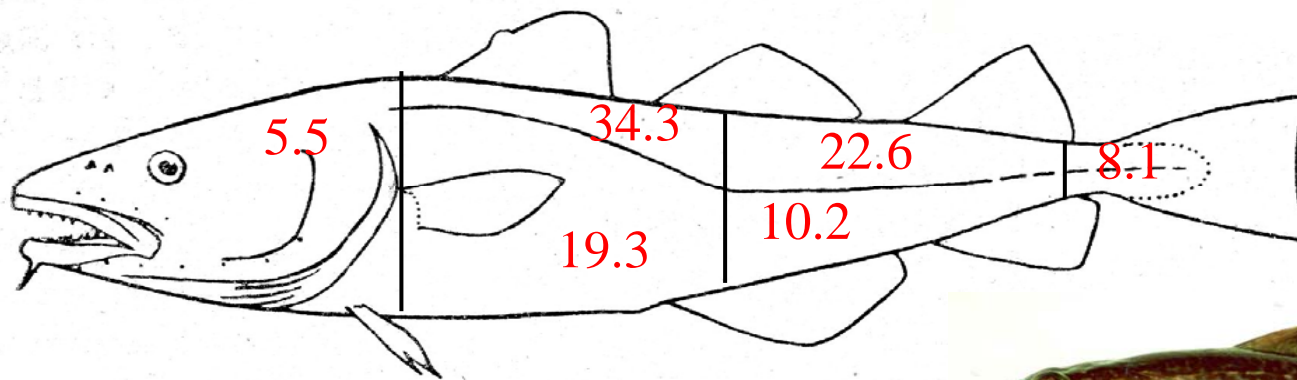


Pacific cod (118 specimens)

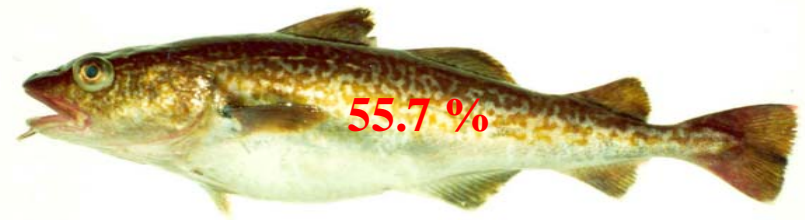


Number of marks 1 - 10 (mean 1.3)

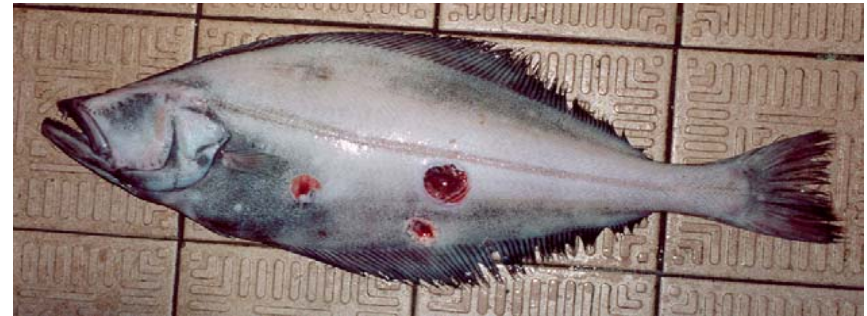
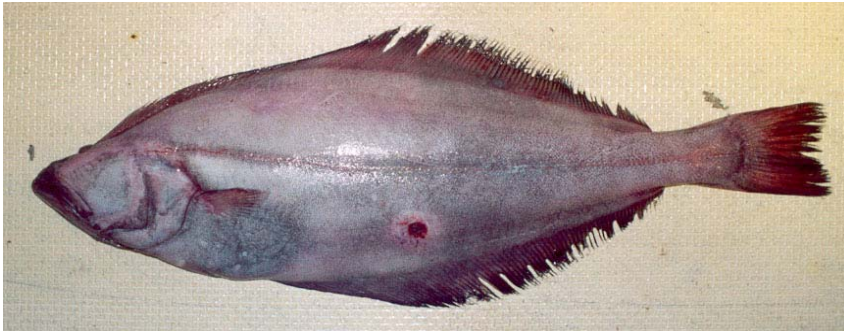
Single marks 65.8%



♂ : ♀ = 41.9 : 58.1

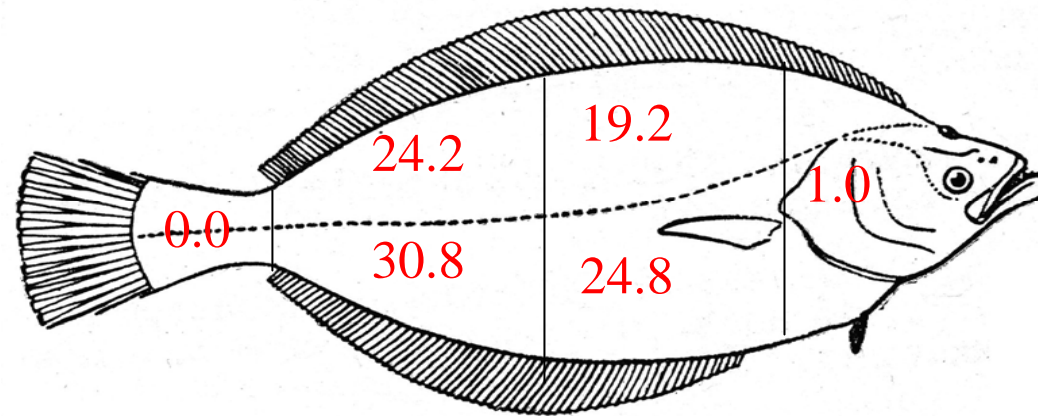


Greenland halibut (76 specimens)

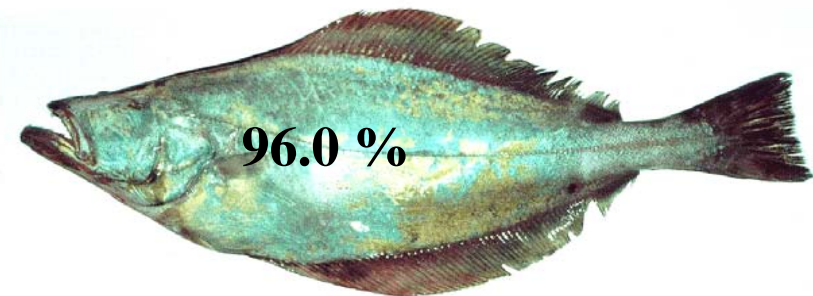
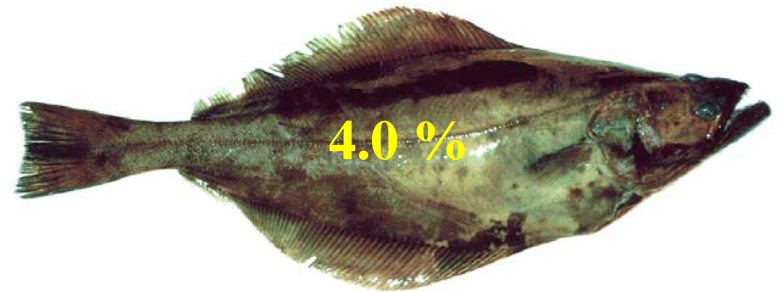


Number of marks 1 - 3 (mean 1.3)

Single marks – 56.0%



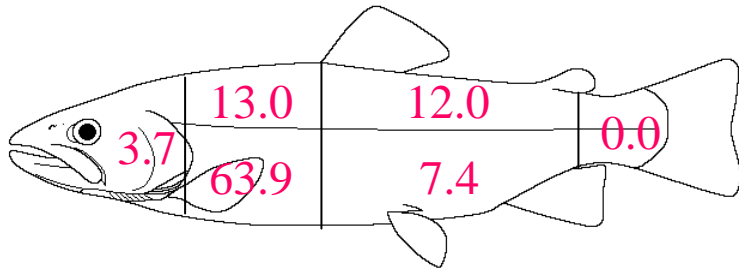
♂ : ♀ = 76.5 : 23.5



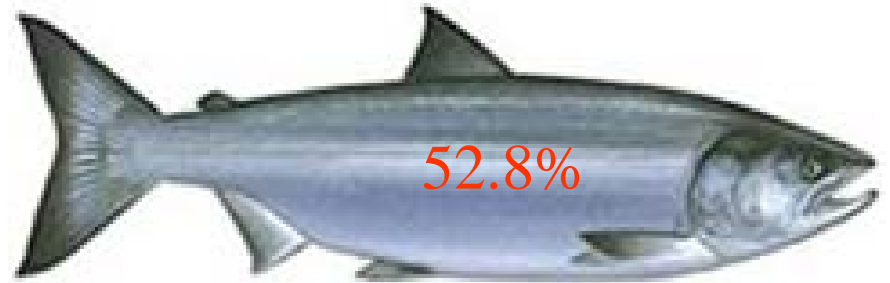
Chum salmon (43 specimens)



Number of marks 1-4 (mean 1.5)
Single marks 50.0%



♂ : ♀ = 48.8 : 51.2

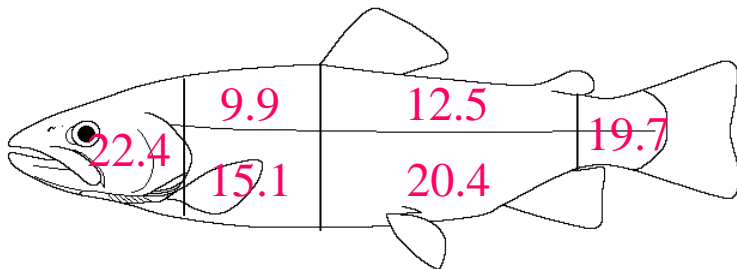


Sockeye salmon (38 specimens)

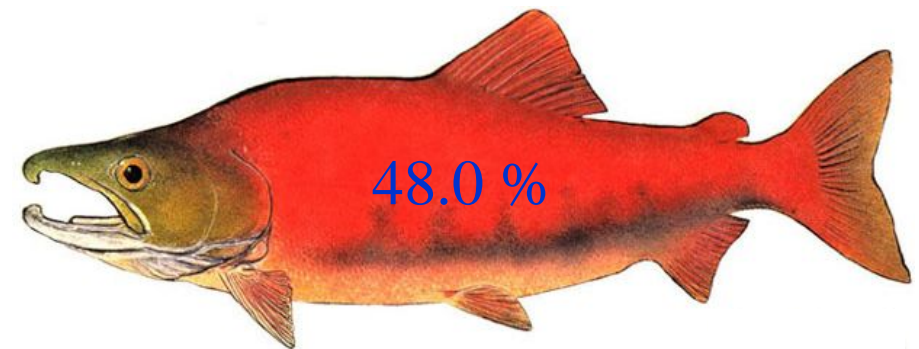
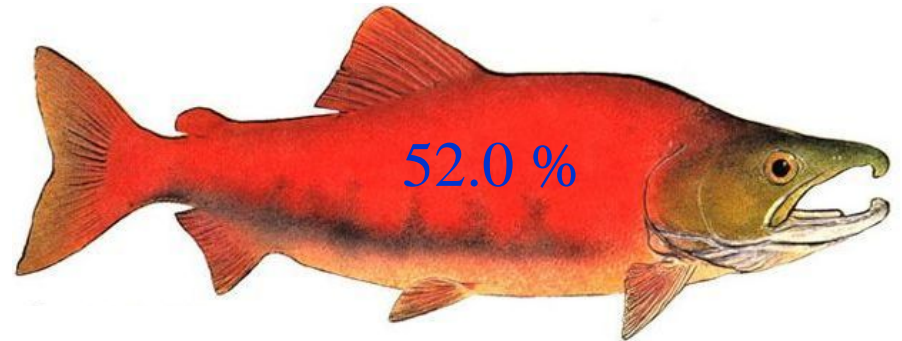


Number of marks 1-3 (mean 1.3)

Single marks 60.9%

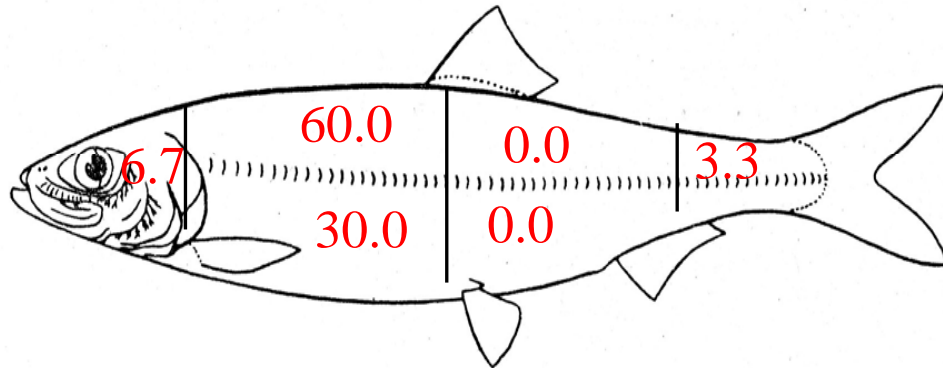


♂ : ♀ = 63.2 : 36.8

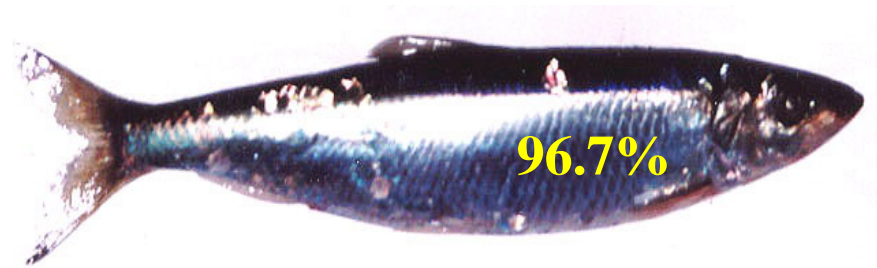


Pacific herring (30 specimens)

Number of marks 1 – 1 (mean 1.0)



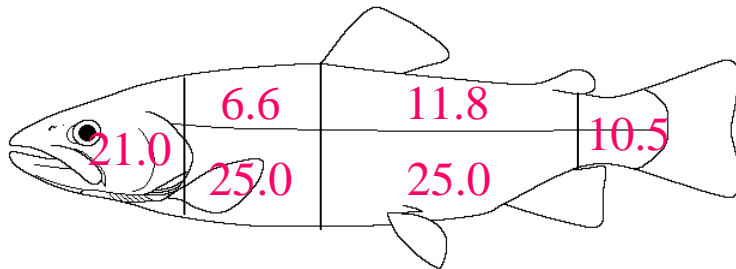
♂ : ♀ = 28.6 : 71.4



Chinook salmon (19 specimens)



Number of marks 1-4 (mean 1.6)
Single marks 46.7%



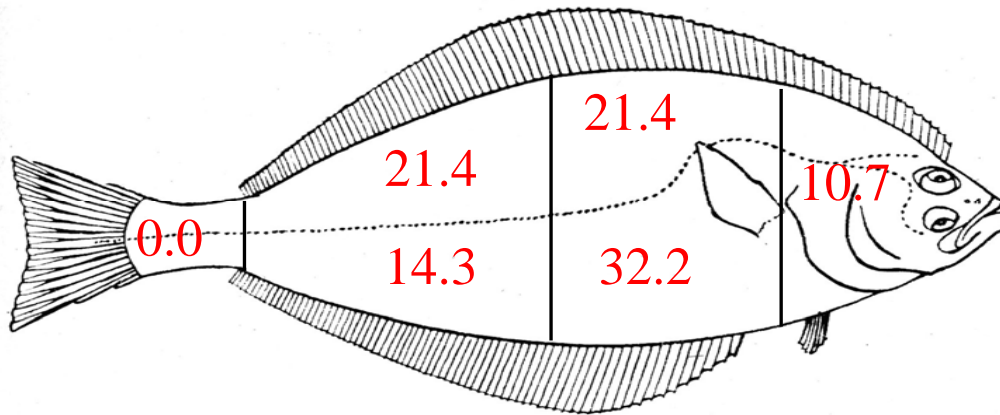
♂ : ♀ = 47.4 : 52.6



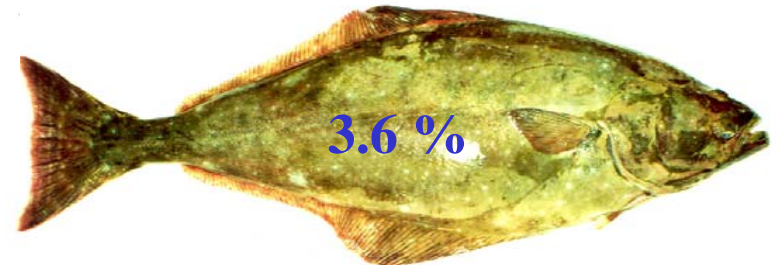
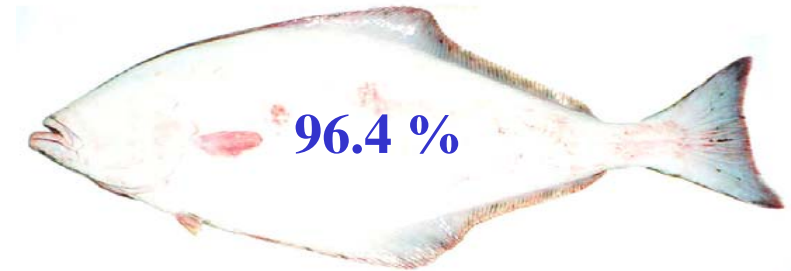
Pacific halibut (14 specimens)



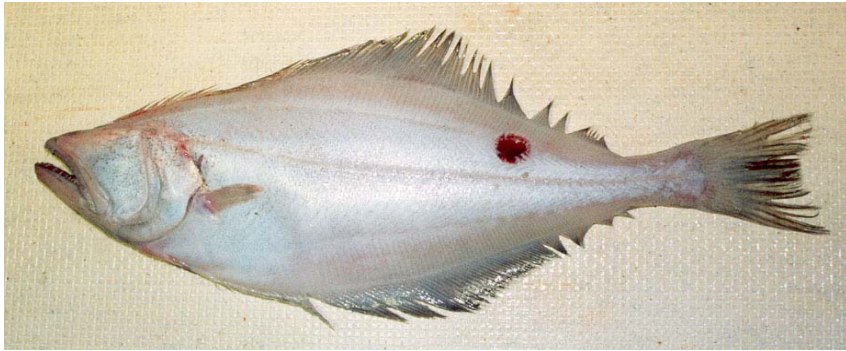
Number of marks 1 - 8 (mean 1.9)
Single marks – 39.3 %



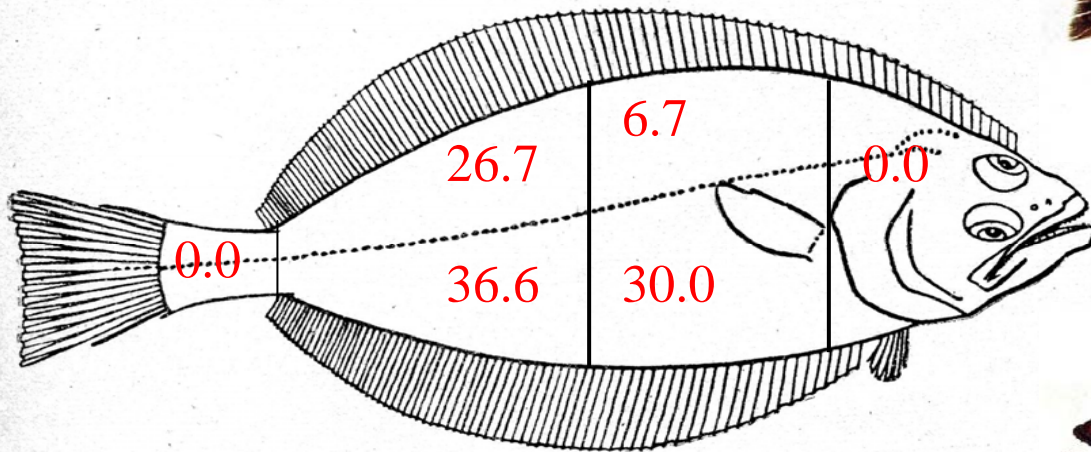
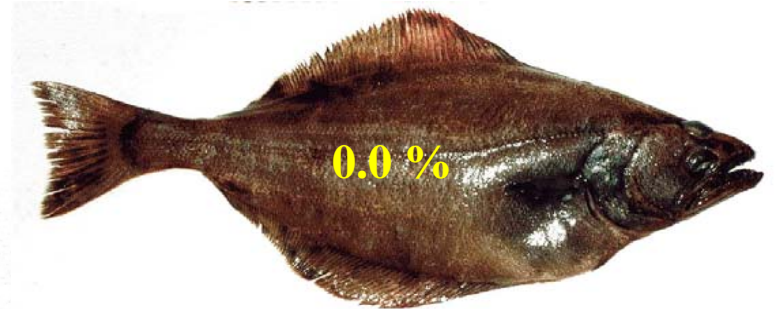
♂ : ♀ = 8.3 : 91.7



Arrowtooth flounder (14 specimens)



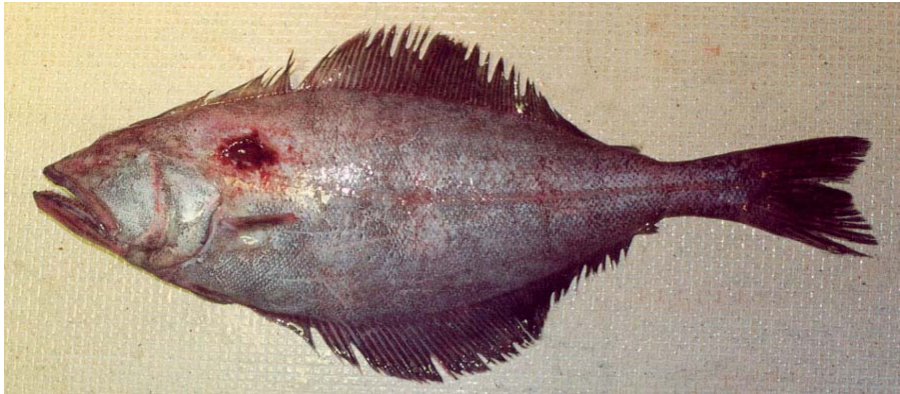
Number of marks 1 - 2 (mean 1.1)
Single marks 86.7%



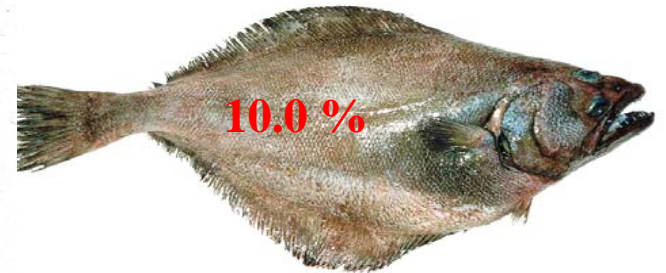
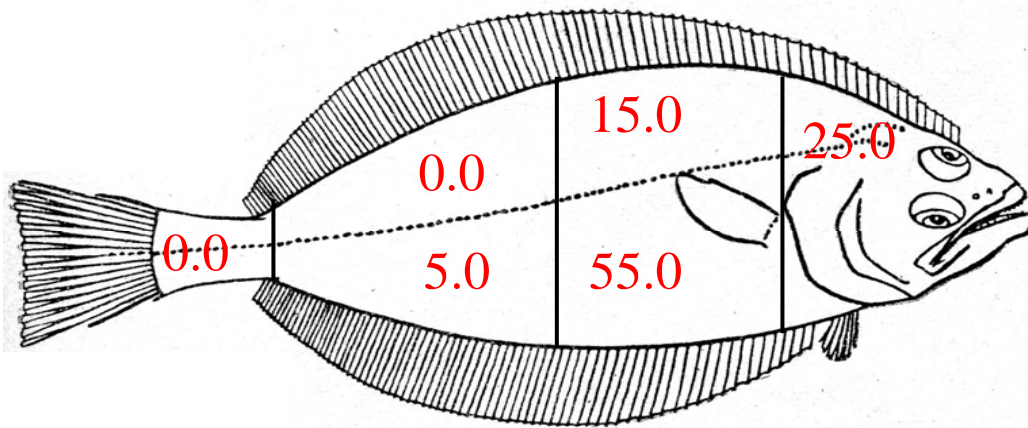
♂ : ♀ = no data



Kamchatka flounder (10 specimens)



Number of marks 1 - 7 (mean 2.0); Single marks 30.0%



$\text{♂} : \text{♀} = 22.2 : 77.8$

Position of Pacific lamprey marks on their host species

Species	Body side		Section					
	Right	Left	I	II	III	IV	V	VI
Greenland halibut	4.0	96.0	19.2	24.2	24.8	30.8	1.0	-
Pollock	51.7	48.3	16.7	30.8	20.7	14.9	8.4	8.5
Herring	96.7	3.3	60.0	-	30.0	-	6.7	3.3
Pacific halibut	3.6	96.4	21.4	21.4	32.2	14.3	10.7	-
Arrowtooth flounder	0.0	100.0	6.7	26.7	30.0	36.6	-	-
Kamchatka flounder	10.0	90.0	15.0	-	55.0	5.0	25.0	-
Cod	44.3	55.7	34.3	22.6	19.3	10.2	5.5	8.1
Chum	52.8	47.2	13.0	12.0	63.9	7.4	3.7	-
Sockeye	52.0	48.0	9.9	12.5	15.1	20.4	22.4	19.7
Chinook	40.0	60.0	6.7	11.8	25.0	25.0	21.0	10.5

Characterization of Pacific lamprey marks on the body of their hosts (nd – no data)

Species	Imprint, %	Wound, %	Scar, %	Fresh wound, %	Diameter, mm	Depth, mm
Greenland halibut	10.0	90.0	nd	nd	15.3	nd
Pollock	20.4	79.6	30.8	69.2	24.1	8.9
Herring	16.7	83.3	nd	nd	13.5	4.7
Pacific halibut	67.9	32.1	nd	nd	11.9	3.3
Arrowtooth flounder	13.3	86.7	nd	nd	13.9	nd
Kamchatka flounder	80.0	20.0	nd	nd	15.0	nd
Cod	6.3	93.7	2.9	97.1	26.6	12.8
Chum	33.3	66.7	16.7	83.3	nd	nd
Sockeye	33.3	66.7	20.0	80.0	nd	nd
Chinook	40.0	60.0	20.0	80.0	nd	nd

THANK YOU FOR YOUR ATTENTION

