HELP MENU *IPEZ* PROGRAM



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I. Introduction

The main aim of the *IPez* program is to identify adult fish at the species level using morphometric variables. The discrimination method of the program is based on the morphological differences between the different taxa. For this purpose, a mathematical treatment has been designed, based on *Machine Learning* techniques, which allows identification of the best variables for differentiating between the different taxa at a specific level (order, family, genus or species). Once these variables have been identified, the most probable taxon can be estimated from the values for morphological variables of the individual fish, using logistic regressions.

Identification can be carried out using the data existing in a file or by direct interactive data insertion. In interactive identification, the identification of the order, family, genus and species is complemented by a photograph that, particularly at the species level, allows comparing the individual to be identified with the photograph in the database. For each taxon, there is direct access to the *FishBase* web page, where there is specific information about that particular taxon.

Besides identification, the program permits the measurement of individuals in a convenient way, by connecting a digital calliper that automatically introduces the measurements into a spreadsheet file format.

In short, the *IPez* program has the following functions:

- 1. Taking morphometric measurements of an individual in a rapid and convenient way, instantly introducing the data from the calliper to the computer.
- 2. Creating a data file that can be saved, and to which data can subsequently be added.
- 3. Creating a different template for each type of morphological variable to be measured.
- 4. Identifying species using specific morphometric variables, by interactive data input or from a file.
- 5. Viewing the list of all species and photographs included in the database.
- 6. Finally, there is a direct link to the *FishBase* web page for each one of the orders, families, genera and species that are in the *IPez* database.

II. Configuration

In *IPez* it is possible to configure the language, the serial port for callipers without USB connection and the way to update the database, photographs, images etc. of the



program. The following menu appears, when "Configuration" option is selected in the main menu.



II.1. Language

The *IPez* program does not work in a single language, but has a multilanguage option. The following window appears, when the "Language" option is selected in the configuration menu.

IPez · Configuration	
Code Language AR Arabic DE German EL Greek EN English FS Spanish FR French IT Italian JA Japanese PT Portuguese RU Russian ZH Chinese 	Code Language
EN English	EN, ES
	Apply

The language you wish to work in can be selected at "Application language", and then confirmed by "Apply", and the program is reset in the selected language.

At "Alternative languages", it is possible to select the languages in which the server will download images, templates and the help file when using automatic update. Hence, it is possible to download files in one or several languages.

II.2. Calliper serial port



When a digital calliper is used with a RS232 connection rather than through a USB port, the characteristics of the calliper and the port to which it is going to be connected can be set up and saved, so that they do not have to be specified each time. Click on to "Configuration" and then on to "Serial port"; the following window will appear in which the characteristics of the calliper can be specified.

IPez · coniguration	1
Serial port calliper	
Properties: COM4 COM1 Baud rate: 4800 Data bits: 7 © Parity • Even • Odd • None Stop bits: 1 • 1.5 • 2 • 0	
	Apply

It should be stressed that if the calliper is not always connected to the same COM port, the port connection will have to be specified each time for the calliper to function.

II.3. Update management

The *IPez* database is continually expanding with the incorporation of new species. The program allows the database to be updated in an automatic or manual way. To choose between automatic and manual update, select "Configuration" and then "Remote update".

Identification	Species	Configuration Help
		 Language Serial port
		Remote update Image: Automatic update Image: Update management

II.3.1. Automatic update

The following window appears in automatic update, where by selecting the "Activate" option, the program will automatically update each time it is started. In



addition to programming automatic update, the option "Do now" can be selected and the program will be updated immediately without having to close and reopen it.

It is possible to define the number of "Downloaded files" for each update. This option is particularly useful when installing *IPez* for the first time. The program downloaded from the web page (<u>www.ipez.es</u>) does not have the photographs that are in the database. Therefore, if the Internet connection is not very fast, the update process could take a long time, and it is possible to divide the downloading over several days.

IPez · Configuration		
😰 Remote support		
Server:	www.ipez.es:10001 Automatic update: Activate	Downloaded files: 10 Do now
		- Appl

II.3.2. Manual update

The following window appears in manual update. If "Search IPez server" is selected, all the new files will be shown and can be downloaded to the computer.

Remote update:								
Туре	File		Language	Date	Size			
🛯 Image	Abramites ed	ques.jpg	EN	10/12/2007 4:04:34	1797578 Bytes			
💵 Image	Abramites.jp	og 🛛	EN	09/12/2007 22:56:12	1743407 Bytes			
Image	Acanthostra	cion quadricornis.jpg	EN	24/03/2008 18:18:24	1158823 Bytes			
Image 🛛	Acanthostra	cion.jpg	EN	24/03/2008 17:55:24	1104516 Bytes			
🛯 Image	Acestrorhyn	ichidae.jpg	EN	27/03/2008 11:15:08	420922 Bytes	20922 Bytes		
Image	Acestrorhyn	ichus abbreviatus.jpg	EN	27/03/2008 11:19:52	441063 Bytes			
Image	Acestrorhynchus lacustris.ipg		EN	27/03/2008 11:03:04	272863 Bytes			
Image	Acestrorhyn	ichus microlepis.jpg	EN	27/03/2008 11:17:06	381421 Bytes			
Image	Acestrorhyn	ichus.jpg	EN	27/03/2008 11:11:30	300085 Bytes			
🗓 Image	Achiridae.jpg	3	EN	16/02/2008 18:09:16	2424660 Bytes			
Imana	Achin is lines	ti le fina	EN	23/03/2008 11:20:06	2520105 Rivitor			
)perational: —								
Filter:					Downl	oaded files:		
0	File type:	All	*	Second III				0 files (0 Byte
3	Language:	Application default langua	ge 🗸	Search II	rez server			1
· · · ·	cangaago.	. internet and and and and	9-			Update selection	Update all	Can



Among the different options of the menu, it is possible to select only some files and then click on "Update selection" or to go directly to "Update all"; thereby downloading all the new files available.

The most practical choice is to leave the default option "All" selected in "File type", so that all the files of *IPez* can be updated. In the "Language" option, it is possible to specify that only the files in the language that *IPez* is working in ("Application default language") are to be downloaded, or alternatively "Multiselection" can be chosen. In the latter case, the program will find in the server all the files of the selected languages in the language configuration menu (see section II.1).

III. Templates

The "Templates" section can be accessed from "File", as is shown in the following window. In this section of the program, templates can be created, which are a sequence of images that show the measurements to be taken. It is a useful tool that makes measuring fish morphometry easier, although it can also be used to measure any other type of organism.



Once in "Templates", the following window appears, where a template can be created, edited or deleted.

emplete folder. NPEZVPLVEN				
emplotes:				12 Templates in folder
Template	Created	Changed	Comments	Full path
Baladia fishes ipl Charles of the state of	15/06/2008 17:44:23 15/08/2008 17:44:23 15/08/2008 17:44:23 15/08/2008 17:44:23 15/08/2008 17:44:23 15/08/2008 17:44:23 15/06/2000 17:44:23 15/08/2008 17:44:23 15/08/2008 17:44:23 15/06/2008 17:44:23	16/09/2008 18: 21/06/2008 13: 16/09/2008 13: 16/09/2008 18: 06/07/2008 12: 09/09/2008 12: 09/09/2008 12: 09/09/2008 10: 06/07/2008 19: 16/09/2008 19:		CVIPEZIPLENBediolifishes ipI CVIPEZIPLENShorks ipI CVIPEZIPLENShorks ipI CVIPEZIPLENALoheyood fattiohes ipI CVIPEZIPLENALoheyood fattiohes ipI CVIPEZIPLENALoheyoit (Faqfabhes) ipI CVIPEZIPLENALOheyoit (Cobe finned fabhes) ipI CVIPEZIPLENASing cotteringti (Lobe finned fabhes) ipI



There are a series of templates already defined for fishes that belong to the class Actinopterygii, for those in the orders Pleuronectiformes, Anguilliformes, Ophidiiformes, Lophiiformes and Syngnathiformes of the class Actinopterygii with a morphology slightly different from the rest of the fishes in that class, for the Batoid fishes and sharks of the class Ellasmobranchii, for the class Cephalaspidomorphi, for the class Myxini, for the class Holocephali and, finally, for the class Sarcopterygii.

Using the buttons indicated in the following screen, it is possible to display the information from the files of each one of the templates.



Information can be obtained about their content and, if modifications have been made in the number of existing templates (for, example if a new template has been created), it is possible to reload the new list of templates in the "IPL" folder, which is where all the templates that are being generated should be saved by default.

III.1. Creating a template

When "Create new template" is selected the following window is shown, where a sequence of morphometric variables to be measured can be defined.

In the sequence of variables included in the template, the code assigned to the variable and the description of the variable can be indicated; it is also possible to assign an image to a morphometric variable, so that it can be seen on screen.

The image is imported into the template by clicking on the button "Image", and it is possible to import file formats, such as jpg, tif, wmf, emf, etc.



By clicking on the button below with a question mark, it is possible to select whether or not the images associated to each variable are shown on the screen.



The variables will appear in the same sequence as they were introduced. The order of the variables can be changed after they have been introduced by using the arrows on the left of the screen.

Any of the variables can be eliminated by positioning the cursor on the variable and pressing the delete key. Several variables can be eliminated at the same time selecting the variable in "Delete"; once "Save" has been selected, the template is recorded excluding the variables selected for deletion.

It is also possible to insert a comment into the template and reload the characteristics of the last template saved at "Reload template", if the modifications that have been made since the last time the template was saved are not wanted.

III.2. Editing a template

Once a template has been created, it can be edited by going again to "Templates" and "Edit template" to make the changes. Variables can be deleted, new variables introduced, while the descriptions of variables, the associated images, the order of appearance of the variables etc. can all be modified. Therefore, any template can be modified using template editing.



IV. Measurement of morphometric variables

The created templates make it possible to take fish measurements using the sequence of morphometric variables that has been defined in the template. To do this, go to "File" and then select "New" to create a new data file. The first thing to appear is the following window, where the data file has to be assigned to the relevant template.

IPez • Select tem	plate:				? 🗙
Buscar en:	😂 EN		~	G 🏚 🖻 🛄 🔻	
Documentos recientes Escritorio Mis documentos Mi PC	Actinoptery Anguilliform Batoid fishe Cephalaspi Holocephal Lophiforms Myxini (Hag Right-eyed Sarcoptery Sharks.ip	rgii (Ray-finned fishes).ipl les (Eels and morays) and Op is.ipl domorphi (Lampreys).ipl i (Chimaeras).ipl latfishes.ipl gfishes).ipl (flatfishes.ipl gii (Lobe-finned fishes).ipl jormes (Pipefishes and seahor	ohidiiformes (Cusi ses).ipi	k eels).ipl	
Mis sitios de red	Nombre:			*	Abrir
	Tipo:	IPez templates (*.ipl)		*	Cancelar

Once the template is selected, the following window appears, where it is possible to introduce the data manually or with the calliper. Each time that the cursor is positioned in a column, the image associated to the variable to be measured is shown. When the value of a variable is taken by default as zero, no associated image appears.

骼 IPoz + I	ndividuals file							
File Name 7-10-20	18.ipf				Dete Last more	created: 12 ification: 12	/10/2006 /10/2006	135510 Template 140534 C-VIPex/IR/LES/Planos Derechos.jpl
Individual	in the file:							Measurement associated image
	Code	M1	M2	M3	M4	M5	^	Description
F 7	Pegusa lascaris	264,78	52,07	0,81	5,55	11,14	2	Longitud estándar
2	Pegusa lascaris	980,00	450,15	186,78	112,21	40,49		Image:
3								
4							- 1	
- D - R								and the second
7								Automatic recording control
8							-51	
9				Pop	ccian	tomnl	ator	
10				nea	SSIGII	tempi	ales	
							-	
12							- 1	
13	-						- 1	
15								
18				1				
17								
18								
19		It can	ho act	ivator		nit a d	-	
20		it can	DE ac	ivalet		int a s	oun	
22		when	the da	ata is s	sent fr	om th	ne ca	alliper
23								·····
24								
25				/				
28				/				
27							- 11	
28							- 1	
29			/				-	
<			/				>	
Comment								Edition control. Autoseve In
		_ /						Active Minutes 5
		/						
		1						Y seconds dispsed
••	Sum 🏨	Digital Co	alliper					🥔 Reessign template 🎦 Save as 🗸 Save 🗶 Close



At the bottom left of the screen, the arrows indicate the direction in which the data are to be introduced. The position in red on the above screen shows the arrow towards the right, which indicates that once the data are introduced it moves to the following column within the same row (different variables are measured for the same individual). If the red arrow is the one pointing downwards, this would mean that once data were introduced it would move to the next row within the same column (the same variable is measured for different individuals). Hence, the same measurement can be taken for a group of fishes or all the measurements can be taken for the same fish.

The program also allows the reassignment of a new template to the data. For instance, when data are being taken about flatfishes and then another type of fish is also to be included in the same data file. In "Reassign template", a new template can be selected. In addition, it is possible to automatically save data after a certain period of time, thereby, not wasting time repeatedly having to save data.

Small changes can be made, such as to copy and paste the content of a cell, but if the templates are to be used like spreadsheets, the template has to be opened with Excel or TextEdit. As is shown in the following screen, to do this the cursor is positioned on the name of the file and, by clicking the right mouse button, a small window appears where the data file being generated with Excel or TextEdit can be opened, and the data editing facilities available in either program can be used.



Other changes that can be made without having to open Excel are to undo the last data that have been introduced. To delete the last data inserted simply click on "Undo". If changes prior to the recording are to be deleted, click on the button next to "Undo",



and the following window will appear, where it is possible to choose the data to be deleted from those already introduced.



Changes can also be made to the template from the data file. For example, suppose an error has been detected, or a variable is to be deleted or a new morphometric variable entered. Position the cursor on the name of the template, in the top right of the screen, double click on the template name and the template will appear on the screen, as is shown in the following window. The necessary modifications can be made and, once saved, the new changes will appear included in the data file currently in use. It should be stressed that these changes also remain recorded in the modified template and, therefore, if a new data file is opened with this template, it will include the changes made.

-2006.pt Kushi in the Peg	e file Code guis lasceris guis lasceris	M1 M2 264.70 50.01	Date created 12/10/2008 Last modification: 12/10/2008 M3 M4 M5	13 56 10 14 22 20 Measurement	Template CNPepNPLIESIPtemp	s Derectios (pl		
Peg	e file Code Iguisa Isscaris Iguisa Isscaris	M1 M2	M3 M4 M5	Measurement				
Peg	Code guise tesceris guise tesceris	M1 M2	M3 M4 M5	Concentration	desociated image			
Peg	iguse tesceris iguse tesceris	284,78 89.07		Description				
Peg	guse lesceris	and no Per IPer - T	R. EL		nicticulty	nomonilouter dat ho	eda cumorios dal ala intarias	al confil concrion
		300.00	Template					
		Templete:	Mana					
			Planos Derechos el			Date crea	sted: 15/06/2008 17:44:23	
						Last modificat	son: 01/10/2008 20:18:52	
		Mensurem	erfs.					
		Code	Description		Associated image	Delete		A
_		M1	Longitud estándar	Image	M1.errf			
-		M2	Distancia del inicio de la boca considera	image	M2.ant			
8		MO	Distancia perpendicular del borde superi	Image	M3 and			
10		3.64	Distancia perpendicular del borde inferio	Image	MA emf			ALL MARKEN I.
22		MS	Diámetro máximo de la cavidad orbital inf	Image	M5.emf			A A A A A A A A A A A A A A A A A A A
10		MS	Distancia del inicio de la boca considera	Image	MD errf			
		M7	Distancia de la comisura de la boca al ini	Image	M7 arrd			
2		MB	Distancia del inicio de la boca considera.	Image	M0 errd			
11 m		MD	Distancia del inicio de la boca considera	Image	MB.end			
2		MID	Distancie de la comisura de la boca a la i	Image	MID and			
12		MIT	Distancia del inicio de la aleta dorsal a la	Image	MILLerrf			
10		MT2	Longitud de la base de la aleta dorsal	Image	M12 amf			
1		M13	Distancia del inicio de la aleta dorsal al in	image	M13 emf			
		M14	Distancia del inicio de la aleta pélvica al i	Image	M14 emf			
8		M15	Distancia del final de la aleta dorsal al ini	Inoge	M15 emf			
		M16	Distancia del final de la aleta dorsal al ini	image	Milliant			- Contraction of the second se
Re la		M17	Su velor es cero	Image	Blenco wmf			TTOT
21		M1B	Su velor es cero	Image	Blenco wmf			
		1		Personal Survey				
10		Comments						
								2
		1.1.1.1		1.44		- In		I
11 () () () () () () () () () (10		-0 0	Save or Save 1	Close
			(E)	1				
ards.							Edition	control Autosmue file
								Artist Martin
								Children and Children and Children
								3 seconds



There is a possibility of adding the data up while working, whether they are introduced with the calliper or manually using the keyboard. Suppose that a measurement is larger than the maximum the calliper can measure. In the bottom left of the screen select "Sum" and each time that data are introduced with the calliper or keyboard, they are added to the previous data. When "Sum" is selected, data delivery by the calliper does not automatically send it to the following cell and, therefore, this has to be carried out manually with the mouse or the keyboard. Once positioned on a new cell, start the adding process again from scratch.

It should be emphasized that the "Sum" button has to be deactivated for the program to stop adding data and move automatically from cell to cell. If it is not deactivated or the cell is not changed, the data will carry on been added. Moreover, the addition can be activated or deactivated by simultaneously pressing the ALT and S keys.

Finally, the program is designed for use with different types of callipers. If a calliper with a direct USB connection is used, the data will be directly introduced to the data file once they are sent by the calliper and move automatically to the following row or column, depending on the type of movement selected with the arrows.

It is worth mentioning that for some callipers with direct USB connection to laptop computers, the number control must be activated, by simultaneously pressing the Fn and Num Lock keys to be able to send the data.

If the calliper has a RS232 connection, "Digital Calliper" should be selected even if the computer is connected to a cable that changes the connection from RS232 to USB. The following window will appear, where it is possible to define the port to which the calliper is connected and its properties, as specified by the manufacturer. These properties can remain recorded by default for when the same calliper is used in the same port, without needing to redefine them.

IPez • Calliper parameters	
Port: COM4 COM1	Properties: Baud rate: 4800 Data bits: 7 Parity: O Even O Odd O None Stop bits: 1 0 1.5 O 2 0
Set as default values	V OK Cancel

To know to which port the calliper is connected, go to "Control panel", then "System", followed by "Hardware", and "Device manager" within that window and, finally, into "Ports (COM & LPT)".



V. Identification of species

One of the most important aims of the *IPez* program is to make the identification of adult fish individuals easier. In the following screen, it can be seen how it is possible in the "Identification" menu to identify a species, by direct interactive data insertion or by using data from a file.



For both forms of identification, interactive or based on data from a file, a series of morphometric variables have to be measured. These are detailed in the Appendix at the end of this Help manual. This Appendix includes all the types of measurements for the fishes belonging to the class Actinopterygii, for those in the orders Pleuronectiformes, Anguilliformes, Ophidiiformes, Lophiiformes and Syngnathiformes of the class Actinopterygii with a morphology slightly different from the rest of the fishes in that class, for the Batoid fishes and sharks of the class Ellasmobranchii, for the class Cephalaspidomorphi, for the class Myxini, for the class Holocephali and, finally, for the class Sarcopterygii.

V.1. Interactive identification

The following window appears in the section "Interactive identification", where the program will request the different morphometric measurements that have to be introduced for each one of the levels to identify the order, family, genus and species.

The first task is to select the type of fish that is going to be identified, left-eyed flatfishes, right-eyed flatfishes, sharks etc. The measurements can be introduced by keyboard or by using the calliper. The procedure for introducing data with the digital calliper is the same to that used for templates. Hence, digital callipers can be used that



are directly connected to the USB port and activation of the calliper will not be necessary, but if digital callipers are used with a RS232 connection, it will then be necessary, as previously explained, to activate the calliper and to define the type of calliper used.



The measurements that have to be inserted to identify each level, order, family, etc., may change as more species are introduced into the database. The program will adapt to the new situation involving the new species, by searching for the measurements that give a better differentiation of the different taxa within each level. When the program updates, all the modifications are automatically incorporated.

Once all the variables are introduced, click on "Identify" to proceed with identification of each one of the levels. When at any level the measurements inserted do not coincide with any of the taxa in the database, the result will be "unidentified", and information can be obtained about the most probable taxon and which measurement deviates from it.

On the other hand, if there has been positive identification, that is, if the order, family, genus or species is identified as belonging to one of the taxa in the database, the most probable taxon to which that individual belongs will appear. If a photograph is available, it will be shown together with information about the taxonomic characteristics of the species.



In addition to identifying the order, family, genus and/or species, available information about any of the taxa can be accessed in the *FishBase* web page, by simply clicking on the relevant taxon, as shown in the following window.



To make identification easier if you already know the order, family and/or genus, there is a direct access that allows the taxon to be specified, without having to insert all the variables necessary for identification at this level. Only the taxa available in the database appear, not all the taxa that exist at that level.





Once a level has been identified, for example the family, the photograph associated to that level can be seen on the main screen, if it is in the database, while the figures for each one of the morphometric measurements required to identify the next level continue to appear on the "Interactive identification" window.



V.2. Identification from file

With this option, it is possible to identify species by introducing data into the program from a file. There are two important differences between "Interactive identification" and "Identification from file". In the former, it is only possible to enter one individual at a time, while in the latter a list of many individuals can be all simultaneously identified. The disadvantage of this second method is that the 32 variables indicated in the Appendix have to be available for each individual, whilst in the former less variables are required, because *IPez* makes a single selection as only one individual is being identified.

In the previously described "Identification" menu, on accessing "Identification from file" the window shown below appears. The name of the file with the individuals to be identified is entered into this window. This file can be one generated directly using some of the templates and that has an "ipf" file extension, or it can be a file generated using Notebook or Excel with a "txt" file extension. Later on, there will be a description of how to set it up. In the *IPez* folder C:/IPez/Docs/Help/ES, there is a file called "Identificar.txt" that can be used as an example.



Once the file is specified, it is possible to open it with Notebook or Excel, in a rapid and convenient way using the buttons marked on the screen, and to make the necessary modifications to the file.



Finally, prior to identification, it is necessary to indicate in what line is the header where the codes of the morphometric variables are indicated, which should have the format M1, M2, M3, M4......M32.

Data: Input CVP	• Identification	from Speci morp	fy on wha hometric	at line are the identifi variables	ers of the	Lentify
Statu	cation: s: 14 lines analyse	d (of 14), 14 valid e	ntries			
Indivi	duals:					
C	Order	Family	Genus	Species	Comments	
	Scorpæeniformes Perciformes Lamniformes Carcharhiniformes Rajformes Bajformes	Scorpaenidae Labridae Lamridae Carcharhinidae Unidentified Unidentified	Helicolenus Symphodus Labrus Isurus Prionace	Helicolenus dactylopterus dactylopterus Symphodus bailloni Labrus bergytta Isurus oxyrinchus Prionace glauca	Possibly: Rajidae (M11 > average; n = 71) Possibly: Rajidae (M11 < average: n = 71)	
68 69 610 611 612 613 614	Characiformes Rajiformes Characiformes Siluriformes Gymnotiformes Characiformes Anquiliformes	Characidae Potamotrygonidae Lebiasinidae Trichomycteridae Sternopygidae Acestrorhynchidae Congridae	Moenkhausia Potamotrygon Pyrrhulina Henonemus Eigenmannia Acestrorhynchus Conger	Moenkhousia lepidura. Patamatrygan motora Pymhulina laeta Henonemus punctatus Eigenmannia virescens Acestrothynchus microlepis Conger conger		
Outpi	at file:		A fol resul	der can be specified v It of the identification	where the file with the n is saved	× Close

As shown in the previous screen, the result of the identification is obtained, and if some individual was not identified at any level, the most probable taxon or taxa is indicated, when the probability of belonging to a taxon is higher than 0.2, together with the measurement that is outside the range for that taxon/taxa. In addition, information appears about the number of individuals that are in the database of that taxon. It could



be that this measurement was badly taken or that, due to the small amount of data for that taxon, the mean is not representative and, therefore, the measurement does not deviate from the taxon because it was badly taken, but because the amount of data for that taxon is insufficient to be able to correctly take that measurement for that particular taxon.

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⁶ /	8	Characiformes	Characidae	Moenkhausia	Moenkhausia lepid	ura		nage, ii Ti)	
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When the cursor is positioned on any of these lines, by clicking on it with the right mouse button it is possible to obtain information about common names (if the identification process has reached species level). After selecting common names, the following window is shown, with the names of that species as they appear in the *FishBase* web page, as well as in local languages and in the indigenous languages of different countries. These names can be ordered by common name, by where the name is used, and by language.

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2 Denmark	Danish			
Norway	Norwegian			
Berggylta				
Sweden	Swedish			
Berggylte				
2 Denmark	Danish			
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By selecting "Images" it is possible to see the photograph of the order, family, genus and/or species, if it has been identified and the photograph is available in the database, then the following window will appear.



When it has not been possible to identify a particular taxon, the images then appear of the last taxon identified, as is shown in the following example.

The species distribution map can also be seen, if it is available in the computer as "Local" or in the database of the "IPez Server". If it is available as "Local", the map will appear as shown in the following window.

If the map is not available in the computer but is available from the server, it is possible to view it and download it from the server and when closing the map it can be saved in the computer if required.

20

As previously described, it is possible to save the file with the results of the identification. Clicking with the right mouse button on the created file, it can be opened with Excel as a spreadsheet and the result of the identification is obtained, as shown below.

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4	3	Perciformes	Labridae	Labrus	Labrus bergylta				
5	4	Lamniformes	Lamnidae	Isurus	Isurus oxyrinchus				
6	5	Carcharhiniformes	Carcharhinidae	Prionace	Prionace glauca				
7	6	Rajiformes	Rajidae	No identificado					
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11	10	Characiformes	Lebiasinidae	Pyrrhulina	Pyrrhulina laeta				
12	11	Siluriformes	Trichomycteridae	Henonemus	Henonemus punctatus				
13	12	Gymnotiformes	Sternopygidae	Eigenmannia	Eigenmannia virescens				
14	13	Characiformes	Acestrorhynchidae	Acestrorhynchus	Acestrorhynchus microlepis				
15	14	Anguilliformes	Congridae	Conger	Conger conger				
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To create a file with a "txt" format from Excel, simply save the file as "TABseparated text". In this file, the first column should indicate the code that has been assigned to the individual and the following columns should include all the previously described measurements. There is no limit for the number of files, so that all the necessary individuals can be identified.

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VI. List of species

The "List of species" can be accessed from the "Species" menu. This list includes all the species recorded in the program for which data of morphometric measurements are available and, therefore, they can be identified.

The species are arranged by classes, orders, families, genera and species, and are alphabetically ordered within each level. If a photograph is available in the database, it is possible to see the photograph for each one of the levels (order, family, genus and species) in the small window and in the window of the main menu.

The most important characteristics that identify the family, genus and species are included in each one of these photographs. At the order level, photographs are shown of all the families in the order that are in the database.

The program can search by scientific names and by common names. In both cases, it is possible to search at all levels (selecting "Any") or at only the level of order, family, genus or species, or even a combination of 2 or 3 levels, quitting the selection "Any" and selecting the search levels. If "B" is selected, the program searches for coincidences at the beginning of the word, if "M" is selected it searches for coincidences in the middle of the word, and with "E" it searches for coincidences at the end of the word.

At the button indicated at the bottom left of the above screen, the display of the on screen search can be modified to a different format, which is shown on the following screen.

By clicking the right mouse button on the photograph of the species, besides being able to see the species distribution map as previously shown, all the common names can be obtained as they appear in the *FishBase* web page, as well as in local languages and in the indigenous languages of the different countries. These names can be ordered by common name, by the countries where the name is used, and by language.

As before, the screen display can be modified to the format shown in the following window.

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Pez - List of species in site database Casufication Gobies octomes Gobies Gobies	Proz Common numes. O Species Scorpenen scrofe Common names. Order by: Common names. Order by: Common names. Common n	Order Pomily Genus: Specier: Specier: Common nome Used in Spain Cope Verde holy holy holy holy holy holy holy costie Spain Cope Verde holy holy holy holy holy holy holy holy costie Spain Cope Verde for the cope Verde holy holy holy holy holy costie Spain Cope Verde cope Verde for the cope Verde cope Verde cope Verde for the cope Verde cope Verde	Scorpaeniformes Scorpaena scrofa Scorpaena scrofa Scorpaena scrofa English English Specish Specish Portuguese Italian Catalen Portuguese Italian Catalen Portuguese Creok, Poht Molea e Malas e Molea e Creok, Poht Portuguese Po	C Longuage	Vertical scale rows Ever than 50	
T) Pesuk	StroBer Drechenkoot	Germany	German	Results: 90 elements found ent on c of head		Isabel Riveiro
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When searching by common names, the information can also be ordered by the names, by where they are used, and by the language to which it belongs.

IPez · List of species	in the database						_ 8 🛛
IPez - List of species Cossilication Cossilication Cossilication Cossilication Costenation Costen	In the database		Order Family Genus Specer	Lamriformas Alopidan Alopida Alopida vulprius		The information available for each level can be accessed in <i>FishBase</i>	
Secorderyge Secord D Dyscientic name Coder by: Fesult: Zorra d Docuped Zorra de mar d Spain Zerro Coder ys: Comp is Comp is Comp is Coder ys: Code Paul	Spenish Alopies vulpirus Spenish Alopies suppirus	B O M O E	Eye Snout shor	s rather small	First dorsal 1	fin closer to pectoral fins	
Spain Spain Zarro blanco	Spanish Alopias vulpinus Spanish Albula vulpes Spanish Albula vulpes Spanish Alopias vulpinus Spanish Alopias supercificous	Results: 21 elements found 💌				Tabel	Riveira
8						×	Qose

As shown in the above screen, the *FishBase* web page for that taxon can also be accessed by clicking on any of the levels (order, family, genus or species).

Finally, there is an option that allows viewing the photographs in different languages. If the cursor is positioned on the photograph, and then the right mouse button is clicked on it, the multilanguage option appears as can be seen in the following screen. This multilanguage option is also available for the photographs that appear in the main menu.

In the multilanguage option, the following window appears detailing the languages in which this photograph is available and whether the photograph is in the computer ("Local") or is available in the server. When it is available in the server, the photograph can be seen in that language. To do this, position the cursor on the image to be downloaded from the server, and then click on "Download from the server".

By clicking on the "Select" button and then on "Close", the photograph will then appear on the "List of species" screen, as shown in the following window. It would be the same process in the main screen.

Using the same procedure, the photographs can be viewed in other languages without having to record them in the computer, in other words, using less computer storage space. However, if the photograph is to be inserted in the

computer, simply do not select the option "Delete images downloaded from the server".

Quitting the multilanguage menu in this way, the photograph will remain recorded in the computer. The next time that this photograph is accessed, the version of the photograph in English will appear as "Local", that is, saved in the computer, whereas previously it was only available in the server.

VII. Appendix

VII.1クラス Actinopterygii

For all species that do not belong to the orders Pleuronectiformes, Anguilliformes, Ophidiiformes, Lophiiformes and Syngnathiformes, which have their own templates that are described later, the measurements used for the identification of individuals are the following.

測定1。標準的な長さ

測定2。口縁から眼縁の切歯骨中心にかけての距離

測定3。眼縁上部から顔面輪郭上部までの垂線の距離

測定4。眼縁下部から顔面輪郭下部までの垂線の距離

測定5。眼窩の最大直径

測定6。切歯骨の中心から背鰭の開始部位までを考慮し口角の開始部位からの距離。背鰭がない場合 はゼロとする。

測定7。口角から背鰭開始部位までの距離。背鰭がない場合はゼロとする。

測定8。切歯骨の中心部位までを考慮し口角の開始部位から上部胸鰭の付着部位までの距離。

測定9。切歯骨の中心部を考慮し、口角の開始部位から鰭の骨盤上部付着店までの距離。

測定10。口角の開始部位から鰭の骨盤上部付着店までの距離。

測定11。背鰭開始部位から鰭の骨盤上部付着店までの距離。両方の鰭が揃っていない場合はゼロと する。

測定 12。すべての背鰭と小鰭を考慮に入れ、背鰭の底辺の長さ。

測定13。背鰭の中心から臀鰭の開始部位までの距離。両方の鰭が揃っていない場合はゼロとする。

測定14。骨盤鰭の開始部位から臀鰭の開始部位までの距離。両方の鰭が揃っていない場合はゼロと する。

測定15。一番最後の背鰭の端からまたは小鰭から骨盤鰭までの距離。両方の鰭が揃っていない場合 はゼロとする。

測定16。一番最後の背鰭の端からのまたは小鰭から骨盤鰭まで距離。両方の鰭が揃っていない場合 はゼロとする。

測定17。一番最後の背鰭の端からのまたは最終または小鰭から脂肪質最終部までの距離。両方の鰭 が揃っていない場合はゼロとする。

測定18。脂肪鰭の最終部位から臀鰭の開始部位までの距離。両方の鰭が揃っていない場合はゼロと する。

測定19。小鰭を含んだ臀鰭の最終部位から尾鰭の底辺までの距離。両方の鰭が揃っていない場合は ゼロとする。

測定20。尾鰭の底辺の幅

測定21。変化可能な周囲を含んだ背鰭の最大周の長さ

測定22。胸鰭変化可能な周囲を含んだ最大周囲の長さ

測定23。変化可能な周囲を含んだ骨盤鰭の最大周の長さ

測定24。骨端や小鰭などの変化可能な周囲を含んだ臀鰭の全体の底辺の長さ

測定25。変化可能な周囲を含んだ最大周囲の長さまたは臀鰭の小鰭の最大周囲の長さ

測定26。尾鰭の開始部位から鰭に最も遠い部位までの距離

測定27。尾鰭変化可能な周囲を含んだ最大周囲の長さ

測定28。上部髭(顎および鼻部分)の長さ。一番長いものを選択すること

測定29。下部髭(顎側面)の長さ。一番長いものを選択すること

測定30。両眼間隔

測定 31。標準的な長さを参考にした身体中央部の幅

測定32。柄の中央部の幅。柄のない場合にはゼロとする。

測定1。合計の長さ

測定2。口縁から眼縁の切歯骨中心にかけての距離

測定3。眼縁上部から顔面輪郭上部までの垂線の距離

測定4。胸鰭への上部付着を考慮した口の開始部位から顎部中心への距離

測定5。眼窩の最大直径

測定6。背鰭への上部付着を考慮した口の開始部位から 切歯骨中心への距離

測定7。口角から背鰭開始部位までの距離

測定8。切歯骨の中心部位を考慮した口の開始部位から 臀鰭開始部位への距離

測定9。切歯骨中心部位の上部付着を考慮した口の開始部位から 胸鰭開始部位への距離

測定10。口の上部付着から骨盤鰭までの距離。骨盤鰭のない場合にはゼロとする。

測定11。背鰭の開始部位から骨盤鰭の上部付着部位までの距離。両方の鰭が揃っていない場合はゼロとする。

測定12。尾鰭の最終部まで含まない背鰭の開始部位から体部最終部位までの長さ

測定13。背鰭の中心から臀鰭の開始部位までの距離。両方の鰭が揃っていない場合はゼロとする。

測定14。骨盤鰭の開始部位から臀鰭の開始部位までの距離。両方の鰭が揃っていない場合はゼロと する。

測定15。骨盤鰭の開始部位から尾鰭を含まない体部最終部位までの距離。骨盤鰭がない場合にはゼロとする。

測定16。尾鰭を含まない 臀鰭の開始部位から体部最終部位までの距離

- 測定17。その値はゼロとする
- 測定18。その値はゼロとする
- 測定19。その値はゼロとする
- 測定20。その値はゼロとする
- 測定21。変化可能な周囲を含んだ背鰭の最大周の長さ
- 測定22。尾鰭の最終部位までを含んだ背鰭の開始部位から体部最終部位までの距離
- 測定23。変化可能な周囲を含んだ骨盤鰭の最大周の長さ
- 測定24。尾鰭の最終部を含む臀鰭の開始部位から体部最終部までの距離
- 測定25。胸鰭変化可能な周囲を含んだ最大周囲の長さ
- 測定26。変化可能な周囲を含んだ臀鰭の最大円周の長さ
- 測定27。体部最終点から尾鰭の最遠部までの平均距離
- 測定28。上部髭(顎部と鼻)の長さ。一番長いものを選択すること。
- 測定29。下部髭(顎部と鼻)の長さ。一番長いものを選択すること。
- 測定30。両眼間隔
- 測定31。合計の長さを参考にした体部中心の幅
- 測定32。その値はゼロとする

VII.1.2. 整理 Pleuronectiformes

For flatfishes, differentiation is necessary between left-eyed flatfishes and those with the opposite symmetry, right-eyed flatfishes. The measurements are the same in both cases, but the different symmetry makes a differentiated representation necessary to make the interpretation of the variables to be measured easier.

測定1。標準的な長さ

測定2。切歯骨の中心を考慮し、口角の開始部から眼角下部までの距離

測定3。眼角下部から上部輪郭までの垂線距離

測定4。眼角下部から下部輪郭までの垂線距離

測定5。眼窩下の最大部直径。

測定6。切歯骨の中心から背鰭の開始部位までを考慮し口角の開始部位からの距離。 背鰭がない場合はゼロとする。

測定7。背鰭の開始部位から口角の開始部位までの距離。背鰭がない場合はゼロとする。

測定8。切歯骨中心部位を考慮し、口角開始部位から胸鰭の上部付着部位までの距離。

測定9。切歯骨中心を考慮し口角の開始部位から骨盤鰭上部付着部位までの距離。

測定10。口角から骨盤鰭の上部付着部位までの距離。

測定11。背鰭の開始部位からから骨盤の上部付着部位までの距離。両方の鰭が揃っていない場合は ゼロとする。

測定12。背鰭の付け根の底辺の長さ

測定13。背鰭の中心から臀鰭の開始部位までの距離。両方の鰭が揃っていない場合はゼロとする。

測定14。腹鰭の付け根からから臀鰭の端までの距離。両方が揃っていない場合はゼロとする。

測定15。腹鰭の付け根から背鰭の端の距離。両方が揃っていない場合はゼロとする。

測定16。背鰭の付け根から臀鰭の端までの距離。両方が揃っていない場合はゼロとする。

測定17。その値はゼロとする

測定18。その値はゼロとする

測定19。尾鰭の底辺から臀鰭の切れ目の端までの距離。両方が揃っていない場合はゼロとする。

測定20。尾鰭の底辺の幅

測定21。変化可能な周囲を含んだ背鰭の最大周の長さ

測定22。胸鰭変化可能な周囲を含んだ最大周囲の長さ

測定23。変化可能な周囲を含んだ骨盤鰭の最大周の長さ

測定24。臀鰭の底辺の長さ

測定25。変化可能な周囲を含んだ臀鰭の最大周囲の長さ

測定26。尾鰭の開始部位から鰭の最も遠い部位までの長さ

測定27。尾鰭変化可能な周囲を含んだ尾鰭の最大周囲の長さ

測定28。その値はゼロとする

測定29。その値はゼロとする

測定30。両眼間隔

測定31。上部および下部輪郭と鰭を服務体部の最大距離。

測定32。柄の厚み。柄のない場合はゼロとする。

VII.1.3.整理 Syngnathiformes

測定1。切歯骨の中心を考慮に入れて口の開始部位から眼縁最短部までの距離

測定2。胸鰭の上部付着から最初の柄または背鰭までの距離。これらの1つでもがかけている場合に はゼロとする

測定3。虫垂を含まない眼縁上部から上部輪郭までの垂線距離

測定4。虫垂を含まない眼縁下部から下部輪郭までの垂線距離

測定5。眼窩の最大直径

測定6。その値はゼロとする

測定7。口角から胸鰭上部付着までの距離。胸鰭がない場合にはゼロとする

測定8。切歯骨中心部開始部分から胸鰭の上部付着までの距離。胸鰭がない場合にはゼロとする

測定9。切歯骨中心部開始部位から骨盤鰭付着直前部までの距離。骨盤鰭がない場合にはゼロとする

測定10。口角から骨盤鰭付着直前部までの距離。骨盤鰭がない場合にはゼロとする

測定11。最初の柄または背鰭の開始部位から骨盤付着直前部までの距離。これらの1つでもがかけて いる場合にはゼロとする

測定12。すべての背鰭と柄を考慮にいれた背鰭の底辺の長さ

測定13。最初の柄または背鰭の開始部位から肛門の開始部位までの距離。両方の鰭が揃っていない 場合はゼロとする。

測定14。骨盤鰭の開始部位から臀鰭の開始部位までの距離。両方の鰭が揃っていない場合はゼロと する。

測定15。一番最後の背鰭の端から骨盤鰭開始部位の距離。両方の鰭が揃っていない場合はゼロとする。

測定16。一番最後の背鰭かの端から臀鰭開始部位までの距離。両方の鰭が揃っていない場合はゼロ とする。

測定17。その値はゼロとする

測定18。その値はゼロとする

測定19。臀鰭の最終部位から尾鰭の底辺までの距離。両方の鰭が揃っていない場合はゼロとする。

測定20。尾鰭の底辺の幅。尾鰭のない場合にはゼロとする。

測定21。変化可能な周囲を含んだ背鰭の最大周の長さ

測定22。胸鰭変化可能な周囲を含んだ最大周囲の長さ

測定23。変化可能な周囲を含んだ骨盤鰭の最大周の長さ

測定24。肛門の底辺の長さ

測定25。変化可能な周囲を含んだ 臀鰭 の最大円周の長さ

測定26。尾鰭の平均開始部位から最遠部の鰭までの尾を含まない距離

測定27。尾自体を含む尾鰭の最大円周の長さ

測定28。その値はゼロとする

測定29。下部髭(顎部)の長さ。一番長いものを選択すること。

測定30。その値はゼロとする

測定31。その値はゼロとする

測定32。その値はゼロとする

VII.1.4.整理 Lophiiformes

測定1。標準的な長さ

測定2。切歯骨の中心を考慮し、口角の開始部から眼角下部までの距離

測定3。その値はゼロとする

測定4。その値はゼロとする

測定5。眼窩の最大直径

測定6。切歯骨中心部位から最初の変化した小骨または背鰭の開始部位までの距離

測定7。口角から最初の変化した小骨または背鰭の開始部位までの距離

測定8。切歯骨中心部位から胸鰭前部または下部付着の距離

測定9。切歯骨中心部位から胸鰭後部または上部付着の距離。

測定10。口角から胸鰭付着の後部または上部付着までの距離

測定11。最後の胸鰭開始部位から胸鰭の前部または下部付着までの距離

測定12。すべての背鰭を考慮した変化可能な小骨の底辺の長さ

測定13。最後の背鰭の底辺の長さ底辺

測定14。骨盤鰭の開始部位から臀鰭の開始部位までの距離。両方の鰭が揃っていない場合はゼロと する。

測定15。骨盤鰭の開始部位から臀鰭の最終部位までの距離。両方の鰭が揃っていない場合はゼロと する。

測定16。臀鰭の開始部位から尾鰭の底辺までの距離。両方の鰭が揃っていない場合はゼロとする。

測定17。その値はゼロとする

測定18。その値はゼロとする

測定19。臀鰭の採集部位から尾鰭の底辺までの距離。両方の鰭が揃っていない場合はゼロとする。

測定20。尾鰭の底辺の幅

測定21。変化可能な周囲を含んだ背鰭の最大周の長さ

測定22。胸鰭変化可能な周囲を含んだ最大周囲の長さ

測定23。変化可能な周囲を含んだ骨盤鰭の最大周の長さ

測定24。小骨など変化可能な周囲を含んだ臀鰭全体の底辺の長さ

測定25。変化可能な周囲を含んだ臀鰭の最大周囲の長さ

測定26。尾鰭の開始部位から鰭の最遠部までの平均距離

測定27。変化可能な周囲を含んだ 尾鰭の最大周囲の長さ。 この長さは26と同値になりうる。

測定28。その値はゼロとする

測定29。その値はゼロとする

測定30。 両眼間隔

測定31。頭部を含む体部の最大幅。

測定32。柄の平均幅。柄のない場合にはゼロとする。

VII.2. クラス Elasmobranchii

VII.2.1. エイ類

測定1。合計の長さ

- 測定2。体部の開始部位から骨盤鰭の前部付着部位までの距離
- 測定3。眼縁下部から上部輪郭までの垂線距離
- 測定4。眼縁下部から下部輪郭までの垂線距離
- 測定5。眼窩下の最大部直径
- 測定6。口の開始部位から骨盤鰭の付着直前部位までの距離
- 測定7。口角から骨盤鰭の付着直前部位までの距離
- 測定8。切歯骨の中心を考慮し口の開始部位から体部下部輪郭までの距離
- 測定9。口の開始部位から肛門の開始部位までの距離
- 測定10。口角の開始部位から肛門の開始部位までの距離

測定11。骨盤の付着直前から背鰭の腹部までの距離。両方の鰭が揃っていない場合はゼロとする。

- 測定12。肛門の開始部位から尾鰭を含む尾の最終部位までの長さ
- 測定13。その値はゼロとする
- 測定14。その値はゼロとする
- 測定15。骨盤鰭付着部位から尾鰭を含む尾の最終部位までの長さ
- 測定16。その値はゼロとする
- 測定17。すべての背鰭を考慮し底辺の長さ。
- 測定18。その値はゼロとする
- 測定19。一番最後の背鰭の端から尾鰭を含む尾の最終部位までの長さ。背鰭がない場合はゼロとする。
- 測定20。骨盤と骨盤鰭の前部付着部位の長さ。
- 測定21。最大の背鰭の最長の長さ 背鰭
- 測定22。その値はゼロとする
- 測定23。骨盤鰭の前部付着部位から最遠位部までの最長の長さ
- 測定24。その値はゼロとする
- 測定25。その値はゼロとする
- 測定26。尾鰭の開始部位から最も遠部鰭までの長さの平均。尾鰭のない場合はゼロとする。
- 測定27。尾鰭の最長の長さ。尾鰭のない場合はゼロとする。
- 測定28。その値はゼロとする
- 測定29。その値はゼロとする
- 測定30。両眼間隔
- 測定31。鰭を含む体部の上部輪郭および下部輪郭の最大距離
- 測定32。体部開始部位から口角の開始部位までの距離

- 測定1。合計の長さ
- 測定2。体部開始部位から眼の開始部位までの距離
- 測定3。鰓以前の距離
- 測定4。頭部の長さ(体部開始部位から最後の鰓まで)
- 測定5。眼窩の最大直径
- 測定6。体部開始部位から最初の胸鰭の開始部位までの距離
- 測定7。口角から最初の胸鰭の開始部位までの距離
- 測定8。体部開始部位から背鰭付着部位直前までの距離
- 測定9。体部開始部位から骨盤鰭直前までの距離
- 測定10。骨盤鰭口角から骨盤鰭付着部位までの距離
- 測定11。最初の背鰭開始部位から骨盤鰭付着部位直前までの距離
- 測定12。すべての胸鰭を考慮したその底辺の長さ
- 測定13。最初の背鰭から臀鰭の開始部位までの距離。両方の鰭が揃っていない場合はゼロとする。
- 測定14。骨盤鰭の開始部位から臀鰭開始部位までの距離。両方の鰭が揃っていない場合はゼロとする。

測定15。骨盤鰭の開始部位から一番最後の背鰭の端からの距離。両方の鰭が揃っていない場合はゼロとする。

測定16。臀鰭の開始部位から一番最後の背鰭の端からの距離。両方の鰭が揃っていない場合はゼロ とする。

測定17。尾鰭の開始部位から一番最後の背鰭の端からの距離。両方の鰭が揃っていない場合はゼロ とする。

測定18。体部開始部位から尾鰭開始部位までの距離の平均

測定19。骨盤鰭開始部位から尾鰭下部の開始までの距離

測定20。尾鰭の底辺の幅

測定21。1枚目の背鰭の最長の長さ

測定 22。胸鰭の最長の長さ

測定23。骨盤鰭の最長の長さ

測定24。臀鰭の底辺の長さ

測定25。臀鰭の最長の長さ

測定26。体部の開始部位から首までの長さ

測定27。尾鰭の最長の長さ

測定28。その値はゼロとする

測定29。その値はゼロとする

測定30。両眼間隔

測定31。最初の背鰭の最長の長さ。小骨のない場合にはゼロとする

測定32。2番目の背鰭の最長の長さ。小骨のない場合にはゼロとする

VII.3. クラス Cephalaspidomorphi

- 測定1。合計の長さ
- 測定2。体部開始部位から眼の開始部位までの距離
- 測定3。体部開始部位から第一気管支裂部までの距離
- 測定4。体部最終部位から最後の気管支裂部までの距離
- 測定5。眼窩の最大直径
- 測定6。体部開始部位から背鰭の開始部位までの距離
- 測定7。最初の背鰭の底辺の長さ
- 測定8。その値はゼロとする
- 測定9。その値はゼロとする
- 測定10。その値はゼロとする
- 測定11。その値はゼロとする
- 測定12。すべての背鰭を考慮した底辺の長さ。背鰭が1枚の場合に限りこの値は7のものと等しくなりうる
- 測定13。背鰭の中心から臀鰭の開始部位までの距離。両方の鰭が揃っていない場合はゼロとする。
- 測定14。その値はゼロとする
- 測定15。その値はゼロとする

測定16。一番最後の背鰭の端から臀鰭の開始部位までの距離。両方の鰭が揃っていない場合はゼロ とする。

測定17。その値はゼロとする

- 測定18。その値はゼロとする
- 測定19。2番目の背びれの底辺の長さ。2番目の背鰭がない場合にはゼロとする
- 測定20。2番目の背鰭の最長の長さ。2番目の背鰭のない場合にはゼロとする
- 測定21。尾鰭を含む最後の気管支裂部から体部最終部までの長さ
- 測定22。その値はゼロとする
- 測定23。その値はゼロとする
- 測定24。尾鰭を含まない尾鰭最終部位から体部最終部位までの長さ
- 測定25。尾鰭を含む最終背鰭から体部最終部までの長さ
- 測定26。尾鰭を含まない臀鰭開始部位から体部最終部までの長さ
- 測定27。 尾鰭を含む臀鰭開始部位から体部最終部までの長さ
- 測定28。その値はゼロとする
- 測定29。その値はゼロとする
- 測定30。両眼間隔
- 測定31。合計の長さを参考にした体部中心部の幅
- 測定32。吸盤の最大直径

VII.4.クラス Holocephali

測定1。合計の長さ

- 測定2。体部開始部位から眼縁までの距離
- 測定3。眼縁上部から顔面輪郭上部までの垂線の距離
- 測定4。眼縁下部から顔面輪郭下部までの垂線の距離
- 測定5。眼窩の最大直径
- 測定6。体部開始部位から背鰭の開始部位までの距離
- 測定7。口角から背鰭開始部位までの距離
- 測定8。体部開始部位から胸鰭の上部付着までの距離
- 測定9。体部開始部位から骨盤鰭付着直前部位までの距離
- 測定10。口角から骨盤鰭付着直前部位までの距離
- 測定11。最初の背鰭の開始部位から骨盤鰭付着直前部位までの距離
- 測定12。すべての背鰭を考慮した底辺の長さ
- 測定13。最初の背鰭開始部から臀鰭の開始部位までの距離。両方の鰭が揃っていない場合はゼロと する。

測定14。骨盤鰭開始部位から臀鰭の開始部位までの距離。両方の鰭が揃っていない場合はゼロとする。

測定15。背鰭最終部位の端からの骨盤鰭の開始部位までの距離。両方の鰭が揃っていない場合はゼロとする。

測定16。背鰭最終部位の端からの臀鰭の開始部位までの距離。両方の鰭が揃っていない場合はゼロ とする。

測定17。背鰭最終部位の端から尾鰭と背鰭の変化部位までの距離。両方の鰭が揃っていない場合は ゼロとする。

測定18。臀鰭最終部位の端から尾鰭の開始部位までの距離。両方の鰭が隠れて揃っていない場合は ゼロとする。

測定19。2番目の背鰭の底辺の長さ。2番目の背鰭がない場合にはゼロとする

測定20。2番目の背鰭の最長の長さ。2番目の背鰭がない場合にはゼロとする

測定21。小骨を含む最初の背鰭の最長の長さ

測定22。胸鰭の最長の長さ

測定23。骨盤鰭の最長の長さ

測定24。鰓弁を含む骨盤鰭の開始部位から体部最終部位までの距離

測定25。体部開始部位から尾鰭と背鰭の変化部位までの距離

測定26。鰓弁を含む 尾鰭上部の開始部位から体部最終部位までの距離

測定27。臀鰭の最長の長さ

測定28。その値はゼロとする

測定29。その値はゼロとする

測定30。両眼間隔

測定31。最初の背鰭の小骨の最長の長さ。小骨がない場合にはゼロとする

測定32。背鰭間の距離

VII.5.クラス Myxini

- 測定1。合計の長さ (もっとも手前の髭の底辺から尾鰭の最端まで)
- 測定2。その値はゼロとする
- 測定3。その値はゼロとする
- 測定4。その値はゼロとする
- 測定5。その値はゼロとする
- 測定6。もっとも手前の髭の底辺から尾鰭と背鰭の変化部位までの距離
- 測定7。もっとも手前の髭の底辺から尾鰭と腹部の変化部位までの距離
- 測定8。口角から尾鰭の腹部開始までの距離
- 測定9。口角から尾鰭と背鰭の変化部位までの距離
- 測定10。その値はゼロとする
- 測定11。その値はゼロとする
- 測定12。その値はゼロとする
- 測定13。背鰭の開始部位から尾鰭の腹部開始部位までの距離
- 測定14。その値はゼロとする
- 測定15。その値はゼロとする
- 測定16。尾鰭の腹部開始部位から尾鰭の最終部位を含まない体部最終部位までの距離
- 測定17。その値はゼロとする
- 測定18。その値はゼロとする
- 測定19。その値はゼロとする

測定20。その値はゼロとする

- 測定21。その値はゼロとする
- 測定22。尾鰭から背鰭の開始部位から尾鰭の最終部位を含まない体部最終部位までの距離
- 測定23。尾鰭から背鰭の開始部位から尾鰭をの最終部位を含んだ体部最終部位までの距離
- 測定24。尾鰭の最終部位を含む尾鰭の腹部開始部位から体部最終部位までの距離
- 測定25。その値はゼロとする
- 測定26。その値はゼロとする
- 測定27。体部最終部から尾鰭の最遠部までの平均距離
- 測定28。上部髭の長さ。一番長いものを選択すること。
- 測定29。下部髭の長さ。一番長いものを選択すること。
- 測定30。その値はゼロとする
- 測定31。合計の長さを参考にして体部中心部の幅。
- 測定32。その値はゼロとする

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- 測定1。合計の長さ
- 測定2。口縁から眼縁の切歯骨中心にかけての距離
- 測定3。眼縁上部から顔面輪郭上部までの垂線の距離
- 測定4。眼縁下部から顔面輪郭下部までの垂線の距離
- 測定5。眼窩の最大直径
- 測定6。切歯骨の中心部位を考慮に入れ、口の開始部分から背鰭開始部位までの距離。。
- 測定7。口角から背鰭開始部位までの距離
- 測定8。切歯骨中心部位を考慮に入れ口の開始部位から胸鰭鰓弁の上部骨盤付着までの距離
- 測定9。切歯骨中心を考慮に入れ口の開始部位から鰓弁の上部骨盤付着までの距離
- 測定10。口角から鰓弁の上部骨盤付着までの距離
- 測定11。背鰭開始部位から鰓弁の上部骨盤付着までの距離
- 測定12。尾鰭の最終部までを含まない背鰭開始部位から体部最終部位までの長さ
- 測定13。背鰭の開始部位から 臀鰭開始部位までの距離
- 測定14。骨盤開始部位から臀鰭の開始部位までの距離。
- 測定15。その値はゼロとする

測定16。臀鰭の開始部位から尾鰭を含まない体部の最終部位までの距離

- 測定17。その値はゼロとする
- 測定18。その値はゼロとする
- 測定19。その値はゼロとする
- 測定20。その値はゼロとする
- 測定21。背鰭の最大の高さ
- 測定22。胸鰭、鰓弁の最長の長さ
- 測定23。骨盤、鰓弁の最長の長さ
- 測定24。臀鰭の開始部位から体の最終部位までの尾鰭の最終部位までを含んだ距離。
- 測定25。尾鰭の最終部位までを含んだ背鰭の開始部位から体部最終部位までの距離
- 測定26。臀鰭の最大の高さ
- 測定27。体の最終部位から尾鰭の最遠部までの距離
- 測定28。その値はゼロとする
- 測定29。その値はゼロとする
- 測定30。 両眼間隔
- 測定31。合計の長さを参考にした体部中心部位の幅
- 測定32。その値はゼロとする

