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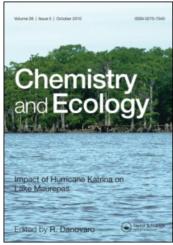
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# Spawning periods calendar of commercial fish in the Adriatic Sea: a preliminary study

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# Spawning periods calendar of commercial fish in the Adriatic Sea: a preliminary study

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The Italian fishing industry, especially the part operating in the Adriatic, has long requested a change to the period of the fishing ban, normally effective in August, when Italy sees the greatest number of tourists. This study aims to contribute to knowledge of the reproductive periods of the main species fished in Italian waters, with the aim of protecting both the biodiversity of seafood and the income of fishermen using the technical ban. The tool chosen was consultation of the available bibliographic and documentary sources, in order to reliably and scientifically define the breeding periods of individual species. The results enabled the development of a reproductive calendar for every species taken into consideration. This calendar provides the technical basis to initiate a discussion on the scientific schedule for the biological bans.

Keywords: spawning calendar; fishing ban; Italy; reproduction; seafood

#### 1. Introduction

Every year the Ministry of Agriculture and Forests issues a decree to enhance responsible fishing in the Italian seas in order to protect sea resources. The decree is part of a three year plan which consists of progressive measures taken to improve the sustainability of sea fishing. The aquatic resource protection plan gives great importance to the scientific evaluation of the measures adopted and to the consequent control of their efficacy.

It is governed by the EU regulation no.2792/99 and includes the procedures to follow for the temporary ban of trawlers and pair trawlers. Until 2004 the Ministry established, on an occasional basis, the ban to take place in August, but from Summer 2005 a strong request to revise the period of the fishing ban was made. In August a large number of tourists are hosted along the coast, should the ban be respected, the high demand for fresh seafood could be satisfied only by using imported products with a consequent blow to local economy as the local fishing industry would be completely excluded. So the request to the change was accepted by the Undersecretary of State for Fishing and Aquaculture and the Ministry of Agriculture and Forests revised the ban in the

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Adriatic in the decree of 14 July 2005. The decree divided the Adriatic coast into three parts and issued this following calendar for the fishing activities.

- 1–30 August 2005: ships registered with the maritime authorities between Trieste and Ancona;
- 13–27 August 2005 and 17 September–1 October 2005: ships registered with the maritime authorities between San Benedetto del Tronto and Manfredonia;
- 3–18 September and 30 September–14 October 2005: ships registered with the maritime authorities between Molfetta and Crotone.

The aim of the study was to gather documentation on sea fish reproduction and give indications on fishing ban periods in the Adriatic Sea.

#### 2. Materials and methods

A very careful survey of the main scientific databases of the sector was made in order to establish the breeding periods of marine fauna fished in the Adriatic Sea. The sources of information examined comprised scientific texts [3–8], articles published in local and national Journals, reports of technical and scientific studies [9–12], grey literature and study reports from the main fishing centres [13–15]. In order to ensure the complete identification of the most commercial species [16], the study was expanded to the systematic visit of fishing industry websites [10,11,13,15]. The method used was based on objective scientifically grounded criteria.

#### 3. Results

The study involves a large number of species because of the rich biodiversity of the Italian sea. Owing to this great variety, knowledge of the breeding periods of each species is fragmentary and dispersed among the different authors and types of publication. There is currently no organised literature on this topic, furthermore there are often differences and disagreements in the sources of information that make it very difficult to compare the known data in order to obtain the correct reproductive pattern. Given that the methodology used in the various literature reports is not always known, the individual bibliographic references are reported for each of the 84 species taken into consideration. The information for each species was thus structured in the form of a calendar.

Results are reported in Table 1: the numbers in the column 'season' indicate the months of the year from December, indicated as month 12, in order to construct a scientifically rigorous reproductive calendar. The reproductive periods are indicated in light shading, with peaks – i.e. the most intense breeding periods – in dark shading. It should be stressed that many species breed over more than one season, and thus the same species has been considered a number of times in various seasons in drawing up the calendar. The month involved in the reproduction of an individual species is shown in grey in the corresponding cell. The sum of the number of shaded cells corresponds to the number of species breeding in that season.

Breeding periods considered by season (as revealed by the literature sources examined) were:

- 93 in winter (32.86%);
- 180 in spring (63.60%);
- 152 in summer (53.71%);
- 77 in autumn (27.20%).

Most reproductive activity is therefore in the spring.

Table 1. Breeding seasons of fauna in the Italian seas (reproductive periods  $\square$ ; the most intense breeding periods  $\blacksquare$ ).

SPECIES	Season	Winter			Spring			Summer			Autumn		
	Month	De	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sept	ii .	Nov
		С	17013414	100000000	P. FOD (75A)	G	0.000	asid	25,53				2020
Anchovy	. / 4750 (5)+												
(Engraulis encrasicolus Anchovy	s • Linnaeus, 1758) (5)*		-	-	-		₩			-	-		-
(Engraulis encrasicolu	ıs • Linnaeus, 1758)												
(16)	ord. Conservation of the Conservation						<u> </u>				<u></u>		
Anchovy													
Anchovy	s • Linnaeus, 1758) (11)		-	┢	-	-	1		-	├			<del>                                     </del>
	s • Linnaeus, 1758) (3)												
Garfish							i			1			
(Belone belone • Linna	aeus, 1761) (16)						<u> </u>			<u> </u>			
Garfish (Belone belone • Linna	nove 1761\ (2\								1	1			
Spanish sardine	aeus, 1761) (3)			┢			1			1	┝	_	-
	lenciennes, 1847) (16)												
Spanish sardine	na Ka imendidak sisany								ĺ				
(Sardinella aurita • Va	lenciennes, 1847) (3)						<u> </u>		<u> </u>	<u> </u>	<u> </u>		<u> </u>
Crayfish ( <i>Palinurus elephas</i> • Fa	abricius 1787) (6)												
Cravfish	abricius, 1707) (0)				1	-	1		<del>                                     </del>	<del>                                     </del>		_	_
(Palinurus elephas • Fa	abricius, 1787) (8)												
Crayfish													
(Palinurus elephas • Fa	abricius, 1787) (15)	_		├	_		₩		<u> </u>	-	<u> </u>		<u> </u>
Argentine	• Linnaeus, 1758) (16)												
Argentine	Elimadas, 1100) (10)						1			1			<del>                                     </del>
(Argentina sphyraena	<ul> <li>Linnaeus, 1758) (3)</li> </ul>												
Argentine													
(Argentina sphyraena European lobster	• Linnaeus, 1758) (9)	_	-	-	-		-		-	₩	_	_	-
(Homarus gammarus	• Linnaeus, 1758) (6)												
European lobster									一				
(Homarus gammarus	<ul> <li>Linnaeus, 1758) (15)</li> </ul>												
European lobster	/ inneque 1759) (0)												
(Homarus gammarus Bogue	• Linnaeus, 1756) (9)			┢			1			1	_		-
(Boops boops • Linnae	eus, 1758) (10)												
Bogue	0.1170/2770 4/0.7770												
(Boops boops • Linnae	eus, 1758) (16)			↓			↓		_	ļ	<u> </u>		<u> </u>
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Bogue	us, 1150) (5)	_	-			-	$\vdash$	_	_	$\vdash$	$\vdash$		_
(Boops boops • Linnae	eus, 1758) (7)												
European squid													
(Loligo vulgaris • Linna European squid	eus, 1758) (8)	_	-	├	-		-	_	├	₩	-		_
( <i>Loligo vulgaris</i> • <i>Linna</i>	eus. 1758) (11)												
European squid	cus, ,, cs, (, ,,												
(Loligo vulgaris • Linna	eus, 1758) (15)			<u> </u>									<u></u>
Striped mullet	1750\ (0\												
(Mugil cephalus • Linn Striped mullet	aeus, 1756) (6)	_	-	├	-		1		-	<del>                                     </del>	-	_	
(Mugil cephalus • Linna	aeus, 1758) (11)												
Striped mullet	7 7 7 7												
(Mugil cephalus • Linn	aeus, 1758) (16)					_	<u> </u>	_	<u> </u>	<u> </u>	<u> </u>		_
Striped mullet (Mugil cephalus • Linn	aeus 1758) (3)												
Striped mullet	uouo, 1100j (0)						1			†			
(Mugil cephalus • Linn	aeus, 1758) (7)												
Red bandfish													
(Cepola rubescens • Li	innaeus, 1766) (9)			-			-			<del>                                     </del>			
Red bandfish (Cepola rubescens • L	innaeus, 1766) (16)												
Mediterranean shad							1			1	$\vdash$		
(Alosa fallax nilotica • 0	Geoffroy, 1827) (16)												
Mediterranean shad													
(Alosa fallax nilotica •	Geoffroy, 1827) (3)												

Table 1. Continued.

SPECIES	Season	Wint	er		Spring			Sumr	ner		Autui		
	Month	De	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept		Nov
		С											
Mediterranean sand ee													
(Gymnammodytes cice 1810) (16)	relus • Ratinesque,									1			
Mediterranean sand ee	1	1	<del>                                     </del>			<del></del>		<del>                                     </del>		╁		<del>                                     </del>	<del>                                     </del>
(Gymnammodytes cice										1			
1810) (3)													
Brown meagre	12227772												
(Sciaena umbra • Linna	aeus, 1758) (16)	┢	₩		_	_		_		-	_	_	├
Brown meagre (Sciaena umbra • Linn	aeus 1758) (10)	1											
Brown meagre	aeus, 1750) (10)	$\vdash$	$\vdash$	-		_		_		-	_	_	$\vdash$
(Sciaena umbra • Linn	aeus, 1758) (3)												
Common dentex		Î	Î			Ì		Î	Î	î			Ì
(Dentex dentex • Linna	aeus, 1758) (3)												
Common dentex													1
(Dentex dentex • Linna	aeus, 1758) (16)	_	_			-				<del>                                     </del>	_	_	_
Tub gurnard (Trigla lucerna • Linnae	ous 1758\ (16\									1			
Tub gurnard	eus, 1750) (10)					<b>—</b>	-	<del>                                     </del>		+-		<u> </u>	<del>                                     </del>
(Trigla lucema • Linna	eus, 1758) (3)												
Streaked gurnard			Î					i –	İ	Î			Î
(Trigloporus lastoviza •	Brunn, 1768) (10)												ļ
Streaked gurnard	D 4700 (0)	1											
(Trigloporus lastoviza •	Brunn, 1768) (3)	₩	<del>                                     </del>		<u> </u>	<u> </u>				-			<u> </u>
Streaked gurnard (Trigloporus lastoviza •	Brunn 1769\ (16\	1											
Caramote prawn	Diami, 1700) (10)	$\vdash$	<del>                                     </del>							1	<b>—</b>	<del></del>	1
(Penaeus kerathurus •	Forsskäl, 1775) (6)	1											
Black goby			†					Î		†			ì
(Gobius niger jozo • Li	nnaeus, 1758) (3)		<u></u>										
European spider crab													
(Maja squinado • Herb	est, 1788) (6)	₩	├		├	<u> </u>	<u> </u>			ļ			├
European spider crab (Maja squinado • Herb	oct 1788) (10)	1											
Harbour crab	C31, 1700) (10)					_	<u> </u>	<del>                                     </del>		<del>                                     </del>			1
	• Linnaeus, 1758) (11)												
Harbour crab		Î	İ			Ì				Î			Î
(Liocarcinus depurator	• Linnaeus, 1758) (6)		<u> </u>							<u> </u>			
Conger eel	4750 (0)												
(Conger conger • Linna	aeus, 1758) (6)	┢	₩		├	₩	-			-		_	-
Conger eel (Conger conger • Linna	aeus 1758) (10)	1											
Conger eel	acus, 1700) (10)	$\vdash$	$\vdash$	<u> </u>	$\vdash$	$\vdash$		1		1		_	╁
(Conger conger • Linna	aeus, 1758) (3)								2.				
Common dolphinfish			T T							Ĭ T			Ĭ
(Coryphaena hippurus	<ul> <li>Linnaeus, 1758) (7)</li> </ul>		Ļ		<u> </u>					<u> </u>			<u> </u>
Common dolphinfish	/: 4750\ (40\												
(Coryphaena hippurus	• Linnaeus, 1758) (16)	₩	├	-		-	-	-	-	-	<u> </u>	-	├—
Chub mackerel (Scomber japonicus co	olias • Gmelin 1788)	1											
(16)	mad Gindini, 1100)												
Chub mackerel		Î	Î			Ì				Ì			Î
(Scomber japonicus co	lias • Gmelin, 1788) (3)	<u> </u>	ļ		<u> </u>			<u> </u>	<u> </u>	<u> </u>			ļ
Sand smelt	1010 101												
(Atherina boyeri • Riss Sand smelt	0, 1810) (3)	₩	├─	-	-	├	_	-	-	-	_	—	├—
(Atherina boyeri • Riss	0 1810) (16)	1											
Leerfish	-, 10.0, (10)	$\vdash$	†								1		†
(Lichia amia • Cuvier,	1831) (16)	L											
Leerfish	Supplied the Common									1			
(Lichia amia • Cuvier,	1831) (3)	<u> </u>	Ļ							<u> </u>		<u> </u>	<u> </u>
European barracuda	- Linnanua 4750 (0)												
(Sphyraena sphyraena	• Linnaeus, 1/58) (3)	$\vdash$	+					-			_	<del></del>	-
European barracuda (Sphyraena sphyraena	• Linnaeus, 1758) (16)	1											
	- Lilliacus, 1700) (10)	$\vdash$				$\vdash$		<del>                                     </del>				_	$\vdash$
Mutable nassa (Nassarius mutabilis • Linnaeus, 1758) (15)													
		1	1			Ì				Î			Î
(Nassarius mutabilis • Blue whiting													
(Nassarius mutabilis • Blue whiting (Micromesistius poutas	ssou • Risso, 1826) (3)		<u> </u>							<u> </u>			
(Nassarius mutabilis • Blue whiting (Micromesistius poutas Blue whiting		<u> </u>											$\vdash$
(Nassarius mutabilis • Blue whiting (Micromesistius poutas Blue whiting	ssou • Risso, 1826) (3) sou • Risso, 1826) (16)												

Table 1. Continued.

SPECIES	Season	Wint	er		Spring	7		Sumr	ner		Autur	mn	
J. LUILU	Month	De	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov
	Montai	C	Jan	l co	IVIGI	Apr	Ividy	3011	301	Aug	Jopi	l OCI	"
Blotched picarel	0		Î						Ì				Ī
(Maena maena • Faco	ciolà, 1918) (3)												<u> </u>
Blotched picarel (Maena maena • Fac	ciolà 1918) (10)												
Poor cod	cioia, 1916) (10)	$\vdash$	_			一			<u> </u>			<del>                                     </del>	<del>                                     </del>
	capelanus • Risso, 1826)												
(16)	20 (20) 32												
Poor cod													
(Trisopterus minutus 1826) (16)	capelanus • Risso,												
Spanish ling		-						_	_	$\vdash$			$\vdash$
(Molva elongata • Ca	nestrini, 1874) (16)												
Spanish ling	ALC-DATE BOTTON - PROPERTY PARTY TO THE PARTY OF THE PART												
(Molva elongata • Car	nestrini, 1874) (3)	_	<u> </u>			<u> </u>			_	<u> </u>			<u> </u>
Striped seabream (Lithognathus mormy)	us • Linnaeus 1758)												
(16)	us - Lilliaeus, 1750)												
Striped seabream			İ			一		Ì				Ì	Ì
	rus • Linnaeus, 1758) (3)												<u></u>
Striped seabream	us - Linnour 4750												
(Lithognathus mormy) (10)	us • Linnaeus, 1/58)												
Lesser octopus		$\overline{}$				一							1
(Eledone cirrhosa • L	innaeus, 1758) (15)												
Lesser octopus	, <u>quar</u> er social												
(Eledone cirrhosa • L	innaeus, 1758) (15)	_								_			<u> </u>
Lesser octopus (Eledone cirrhosa • Lin	nnaeus 1758) (13)												
Murex	maeus, 1750) (15)	H		<u> </u>		_			<del>                                     </del>	<del>                                     </del>			<del>                                     </del>
(Murex brandaris • Li	nnaeus, 1758) (15)												
Murex			Ī										Ī
(Murex brandaris • Linnaeus, 1758) (10)		_								<u> </u>			<u> </u>
Murey brandaris • Li	nnaeus 1758) (13)												
(Murex brandaris • Linnaeus, 1758) (13) Forkbeard		_				_				<u> </u>			_
(Phycis phycis • Linna	aeus, 1758) (9)												
Forkbeard	account of the fact of		ĺ										Ì
(Phycis phycis • Linna	aeus, 1758) (16)												_
European hake	us • Linnaeus, 1758) (8)												
European hake	15 - Lilliaeus, 1756) (6)						-						1
	us • Linnaeus, 1758) (3)												
Fly-specked moon sna													Î
	ıscarum • Gmelin, 1791)												
(15) Saddle bream		<del>-</del>	_	-	_	<del>                                     </del>	<u> </u>		-				<del>                                     </del>
(Oblada melanura • L	innaeus, 1758) (16)												
Saddle bream			Ì			Ì			1				Ì
(Oblada melanura • L	innaeus, 1758) (10)		<u> </u>						<u> </u>	<u> </u>			<u> </u>
Saddle bream	innocus 17E0\ (2\												
(Oblada melanura • L Saddle bream	aeus, 1738) (3)	$\vdash$	$\vdash$						<del>                                     </del>	$\vdash$			-
(Oblada melanura • L	innaeus, 1758) (9)												
Shi drum									i T				Î
(Umbrina cirrosa • Lir	nnaeus, 1758) (3)												<u> </u>
Shi drum (Umbrina cirrosa • Lir	ansous 1759\ (0\												
Shi drum	macus, 1700) (8)		$\vdash$	_		_							1
(Umbrina cirrosa • Lir	nnaeus, 1758) (16)												
Shi drum	and the same of th												
(Umbrina cirrosa • Lir	nnaeus, 1758) (11)	_	_										_
	Gilthead seabream (Sparus aurata • Linnaeus, 1758) (8)												
Gilthead seabream	2005, 1100) (0)		$\vdash$		<u> </u>	$\vdash$	_	_	<del>                                     </del>	_	_		1
(Sparus aurata • Linn	aeus, 1758) (16)												
Gilthead seabream													
(Sparus aurata • Linn	aeus, 1758) (11)		<u> </u>			<u> </u>			ļ	ļ			_
Gilthead seabream	2015 1758) (2)												
(Sparus aurata • Linn Gilthead seabream	aeus, 1700) (3)	<b>—</b>	_		<del></del>	$\vdash$	$\vdash$		-	_			-
(Sparus aurata • Linn	aeus, 1758) (9)												
Common pandora	The state of the s		Ì			Ì		Ì	Ì	Ì		Î	Ì
	Linnaeus, 1758) (3)										II .		

Table 1. Continued.

Common pandora (Pagellus erythrinus • Li Common pandora (Pagellus erythrinus • Li Common pandora	Season Month	Wint De c	er Jan	Feb	Spring	Apr	May	Sumr	T		Autur		
Common pandora (Pagellus erythrinus • Li Common pandora (Pagellus erythrinus • Li Common pandora			Jan	reb	II Mor	Anr	II AAMY	I II IIO					N. Committee
(Pagellus erythrinus • Li Common pandora (Pagellus erythrinus • Li Common pandora				100000000	IVIGI	Abi	May	3011	Jul	Aug	Sept	Oct	Nov
(Pagellus erythrinus • Li Common pandora (Pagellus erythrinus • Li Common pandora		Ť	-	_						<u> </u>			-
Common pandora ( <i>Pagellus erythrinus</i> • <i>Li</i> Common pandora	innaeus, 1758) (9)												
Common pandora		T								i –			
	innaeus, 1758) (8)												
(Pagellus enthrinus - Li	, , , , , , , , , , , , , , , , , , ,	$\Box$											
(r agenus eryunnus • Li	innaeus, 1758) (16)												
Common pandora									ı				
(Pagellus erythrinus • Li	innaeus, 1758) (11)	_											
Red porgy	1750 110												
(Pagrus pagrus • Linnae	eus, 1758) (16)	₩	<u> </u>	<u> </u>		_	<u> </u>	_	<u> </u>	<u> </u>			├──
Red porgy (Pagrus pagrus • Linnae	1759\ (10)								l				
Red porgy	505, 1750) (10)	┢	<del></del>	_	_	_	-		-	_		_	-
(Pagrus pagrus • Linnae	eus 1758) (3)												
Red porgy	, , , , , , , , , , , , , , , , , , ,	$\vdash$	1		1	_		1	-	1		-	1
(Pagrus pagrus • Linnae	eus, 1758) (9)								l				
Atlantic bonito		ÎΠ	Ì						Î	Ì		Ì	Î
(Sarda sarda • Bloch, 17	793) (16)												
Atlantic bonito		Т											Ĭ
(Sarda sarda • Bloch, 1)	793) (1)												
Atlantic bonito	12 2520 - W2W	1											
(Sarda sarda • Bloch, 17	793) (3)	₩			_					<u> </u>			<u> </u>
Smooth Hound	4750) (0)												
(Mustelus mustelus • Lir	nnaeus, 1758) (8)		<b>├</b>			_	<u> </u>		-	<u> </u>		_	-
Smooth Hound (Mustelus mustelus • Lir	nnaque 1750\ /11\	1											
Smooth Hound	maeus, 1756) (11)	$\vdash$				_	-						
(Mustelus mustelus • Lir	nnaeus 1758) (3)												
Mantis shrimp	11000, 1100) (0)	$\overline{}$											
(Squilla mantis • Linnaeu	ıs. 1758) (8)								l				
Mantis shrimp		${}^{\dagger}$							i				1
(Squilla mantis • Linnaeus, 1758) (11)													
Mantis shrimp		ÎΠ			i –				Î	i –		Î	
(Squilla mantis • Linnae	us, 1758) (15)												
European sprat													
(Sprattus sprattus • Linn	naeus, 1758) (16)				<u> </u>					ļ			Ļ
European sprat									l				
(Sprattus sprattus • Linn	naeus, 1758) (3)	₩	<u> </u>	_			<u> </u>	_	-	<u> </u>			<del></del>
European sprat	20010 1759) (0)												
(Sprattus sprattus • Linn European flounder	iaeus, 1750) (9)	$\vdash$	<u> </u>	-	_	-	<del>                                     </del>	_	-	<del></del>		-	_
(Platichthys flesus luscu	ıs • Linnaeus 1758)								l				
(3)	is Limacus, 1700)								l				
European flounder		$\overline{}$							i				1
(Platichthys flesus luscu	ıs • Linnaeus, 1758)								l				
(9)	377 MINISTER AND AND AND AND AND AND AND AND AND AND												
European flounder													
(Platichthys flesus luscu	ıs • Linnaeus, 1758)								l				1
(7)		-	_		_			_		<u> </u>	<u> </u>	_	_
European flounder (Platichthys flesus luscu	is • Linnaque 1750												
(16)	is - Lilliaeus, 1706)												
European flounder		1	1	1						$\vdash$			1
(Platichthys flesus luscu	ıs • Linnaeus. 1758)												
(11)													
African armoured searob		T											
(Peristedion cataphractu		1											
(16)		<u> </u>		<u></u>	<u> </u>								<u></u>
African armoured searob													
(Peristedion cataphractu	m • Linnaeus, 1758)	1							l				
(3)		+	<del> </del>	<u> </u>		_	-		_				
Atlantic stargazer (Uranoscopus scaber • L	innaque 1759\ /2\	1											
Atlantic stargazer	aeus, 1700) (s)	+	<del>                                     </del>	<del>                                     </del>		_	-	-	-	_	-	_	<del>                                     </del>
(Uranoscopus scaber • I	Linnaeus 1758\ (16\												
Atlantic stargazer	Liiiidous, 1700) (10)	$\vdash$	_	<del>                                     </del>								<del>                                     </del>	1
(Uranoscopus scaber • I	Linnaeus, 1758) (10)												
John Dory	, 7, (10)			Î									
(Zeus faber • Linnaeus,	1758) (16)												
John Dory		T						Ì					Î
(Zeus faber • Linnaeus,	1758) (10)												
John Dory	S PORTO CONTRACTOR												
(Zeus faber • Linnaeus,	1758) (9)								<u></u>				

Table 1. Continued.

SPECIES	Season	Winter			Spring			Sumr	mer		Autu		
	Month	De	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sept	Oct	Nov
		С		1111000000	1010 91975	.::: #6:10	100000000000000000000000000000000000000	100000000	12.00/2017		a solutil	100000	
Silver scabbardfish	P 1 1999 151												
(Lepidopus caudatus •	Euphrasen, 1788) (3)		-				_		_	-			<del>                                     </del>
Silver scabbardfish (Lepidopus caudatus •	Euphroson 1700\ /0\												
Silver scabbardfish	Euphrasen, 1766) (9)	_						-	-	-			
(Lepidopus caudatus •	Fuphrasen, 1788) (16)												
Swordfish	Euphiacon, 1700) (10)					_	1	1	1	<del>                                     </del>			
(Xiphias gladius • Linna	aeus, 1758) (8)		1		1								
Swordfish			Î		Ì	Ì			Ì	ì			Î
(Xiphias gladius • Linn	aeus, 1758) (11)												
Swordfish	0 8 303												
(Xiphias gladius • Linna	aeus, 1758) (3)	<u> </u>	<u> </u>		<u> </u>	<u></u>			<u> </u>	<u> </u>			<u>Ļ</u>
Swordfish	4750 (0)												
(Xiphias gladius • Linna	aeus, 1758) (9)	₩	-		-	₩	-	-	-	-		├	├
Thresher shark	notorro 1700\((2)		1		1							ı	
(Alopias vulpinus • Bon Thresher shark	materre, 1700) (3)	₩	┼─		$\vdash$	<u> </u>	-	-	<del>                                     </del>	-	_	_	<del> </del>
(Alopias vulpinus • Boi	nnaterre 1788\ (5)		1		1								
Common octopus	materio, 1700) (c)	$\vdash$	1	-	<b>—</b>			_		1			$\vdash$
(Octopus vulgaris • Cur	vier, 1797) (8)		1										
Common octopus		ÌТ								ì			ì
(Octopus vulgaris • Cur	vier, 1797) (15)												
Common octopus	60 POTE SCIENCE BOOTSA.												Г
(Octopus vulgaris • Cu	vier, 1797) (11)			ļ									
Common octopus						1				1			
(Octopus vulgaris • Cur	vier, 1797) (1)	₩	-		-	₩	_		-	-	_		₩
Common octopus	in 4707) /7)				1					1			
(Octopus vulgaris • Cur	vier, 1797) (7)	┢	-	_	-	-		_	┢	<b>├</b>	-	_	₩
Anglerfish	innaeus 1758\ (3)									1			
Anglerfish	(Lophius piscatorius • Linnaeus, 1758) (3)		-	_	1					1		$\vdash$	╁
(Lophius piscatorius • L	innaeus, 1758) (7)		1										
Anglerfish										1			一
(Lophius piscatorius • Linnaeus, 1758) (8)													
Anglerfish													
(Lophius piscatorius •	Linnaeus, 1758) (16)			ļ					<u> </u>	<u> </u>			
Thornback ray					1								
(Raja clavata • Linnaeu	ıs, 1758) (8)	<u> </u>	ļ		<u> </u>				<u> </u>	<u> </u>			़—
Thornback ray	4750\ (44\									1			1
(Raja clavata • Linnaeu	is, 1758) (11)	┝	-	<u> </u>	-	₩	-		├	-	-	-	├—
Thornback ray (Raja clavata • Linnaeu	is 1758\ (3)									1			1
Starry ray	15, 1700) (5)		1	<del>                                     </del>						1			<del>                                     </del>
(Raja asterias • Linnae	us. 1758) (5)												
Greater amberjack	25, 1155, (5)	一	i	1				i		1	m		一
(Seriola dumerili • Riss	o, 1810) (16)		1										
Greater amberjack		Î	Ì							Ï			Î
(Seriola dumerili • Riss	o, 1810) (3)	<u></u>	ļ							<u> </u>			<u></u>
Brill	Un. Understall Note:												
(Scophtalmus rhombus	• Linnaeus, 1758) (3)	<u> </u>	<b>—</b>	_	<u> </u>	_	_		_	-			<del> </del>
Brill	* Lippour 1750\ /0\												
(Scophtalmus rhombus Brill	- Lilliaeus, 1706) (9)	<del>                                     </del>	+		-	-	_	-	1	1		-	+
(Scophtalmus rhombus	s • Linnaeus 1758) (16)												1
Brill			1						1	$\vdash$			-
	• Linnaeus, 1758) (11)												
Transparent goby		Ì	Î		ì			Ī	Î	Ì			î
(Aphia minuta • Risso,	<i>1810</i> ) (16)												
Transparent goby													
(Aphia minuta • Risso,	1810) (3)	_			<u> </u>	<u></u>	_		<u> </u>	ļ			<u> </u>
Transparent goby	1010) (0)												
(Aphia minuta • Risso,	1810) (9)	₩	₩	<u> </u>	-	₩	-		-	-		_	₩
Saupe	1759\ (2\												1
(Boops salpa • Linnaeu	18, 1708) (3)	₩	<del>  -     -</del>	<del> </del>		_	_	_	-	-		-	<del>                                     </del>
Saupe (Boops salpa • Linnaeu	is 1758) (10)												
Common two-banded s			$\vdash$	1				_					1
(Diplodus vulgaris • Ge													
Common two-banded s		⇈	†	1	1	1		1	1	1			1
(Diplodus vulgaris • Ge													1
Common two-banded s		Î	Î	Î	î	Î		Ì	ì	Ì			î
	offroy, 1817) (9)			I	1	1	1		I	1			1

Table 1. Continued.

SPECIES	Season	Wint	er		Sprin	g		Sumi	mer		Autui	'nn	
	Month	De	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov
		С	DOING THE REAL PROPERTY.	100000000	000000000000000000000000000000000000000	C-11		oc.stdd.	(2453/)		and Eth	10050	10005000
Bullet tuna													
(Auxis rochei • Risso,	1810) (16)	<u> </u>	<u> </u>		-		_		_				<del>                                     </del>
Bullet tuna (Auxis rochei • Risso,	1910) (2)												
Little tunny	1810) (3)	₩	╁			-		<del></del>				_	-
(Euthynnus alletteratus	• Rafinesque 1810)												
(3)	rtamiooquo, 1010)												
Little tunny			Î					Î					
(Euthynnus alletteratus	s • Rafinesque, 1810)												
(9)		—	↓						<u> </u>				<u> </u>
Little tunny	D-5 1010)												
(Euthynnus alletteratus (16)	• Rannesque, 1610)												
Tuna		$\vdash$	$\vdash$			<b>—</b>	-	-	1	_		_	_
(Thunnus thynnus • Lin	naeus, 1758) (8)												
Tuna	- Control of the Cont									1			
(Thunnus thynnus • Lin	naeus, 1758) (16)												
Tuna	340300 500		$\Box$										
(Thunnus thynnus • Lii	nnaeus, 1758) (11)		<u> </u>										<u></u>
Tuna	4750 (0)												
(Thunnus thynnus • Lii		₩	├					_	-	-			<u> </u>
Broadtail shortfin squid													
(Illex coindetii • Verani European flying squid	, 1039) (13)	╁	╁				_		-	-		_	-
(Todarodes sagittatus	• Lamarck 1798) (11)									1			
Greater weever	Edition, 1100) (11)	$\vdash$	$\vdash$										1
(Trachinus draco • Lin	naeus, 1758) (16)												
Greater weever						Ì		Ì		Ì			Î
(Trachinus draco • Lin	naeus, 1758) (3)												
Greater weever	80.50.710.0000												
(Trachinus draco • Linn	naeus, 1758) (9)	₩.	<u> </u>		ļ	<u> </u>	_	_	<u> </u>	ļ			<u> </u>
Red mullet	4750) (0)												
(Mullus barbatus • Linn Red mullet	laeus, 1756) (6)	₩	₩	-	-	₩	-	-	-	-	-	<u> </u>	-
(Mullus barbatus • Lini	naeus 1758) (16)												
Red mullet	1000, 1700) (10)	$\vdash$	$\vdash$		<u> </u>	1		<del></del>		1			$\vdash$
(Mullus barbatus • Linn	aeus, 1758) (11)									l .			
Red mullet			i —										
(Mullus barbatus • Lini	naeus, 1758) (3)												
Red mullet													
(Mullus barbatus • Lini	naeus, 1758) (9)	₩	-				_		<u> </u>	-			<u> </u>
Striped red mullet	innocus 1750) (0)												
(Mullus surmuletus • L Striped red mullet	IIIIaeus, 1756) (6)	₩	$\vdash$	-		-	-	_	1	1	-	_	_
(Mullus surmuletus • L	innaeus 1758) (16)												
Striped red mullet	minaede, 1700) (10)	⇈	$\vdash$			$\vdash$		1		1	i		1
(Mullus surmuletus • L	innaeus, 1758) (11)												
Striped red mullet	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	İ	Ì		Ì					İ	İ		
(Mullus surmuletus • L	innaeus, 1758) (3)								<u> </u>				
Striped red mullet													
(Mullus surmuletus • L	ınnaeus, 1758) (9)	<u> </u>	-						_	-			
Blue shark	1758\ /2\												
(Prionace glauca • Linr Blue shark	iacus, 1700) (3)	1	1								_	_	_
(Prionace glauca • Linn	naeus, 1758) (9)								I .				
Scaldfish		$\vdash$	†	1				1					
(Arnoglossus laterna •	Walbaum, 1792) (16)	L		L									
Scaldfish	STATE OF STA	$\Box$	$\Box$										
(Arnoglossus laterna •	Walbaum, 1792) (3)	<u></u>											
Scaldfish													
(Arnoglossus laterna •	vvalbaum, 1792) (9)	<b>—</b>	-			-							-
Picarel	2010 1759\ /46\												
(Maena smaris • Linna Picarel	ieus, 1/38) (16)	-	$\vdash$			-	-	-	-	-	-	_	-
(Maena smaris • Linna	neus 1758) (3)												
(Macria Silialis - Lillila	1003, 1700) (3)			1	JL	J		I	1		J		

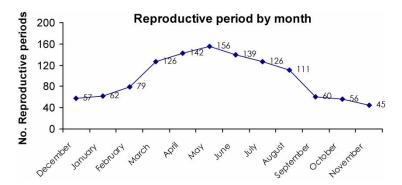


Figure 1. Reproductive period by month.

May demonstrated the highest breeding activity, as seen in Figure 1.

#### 4. Discussion and conclusion

The data obtained deviates considerably from that currently considered as certain and taken to justify the choice to ban fishing in August. We therefore consider it necessary to change the criteria. Thanks to this knowledge of the breeding activity of the various species, the choice of the suspension period could aim to protect the spawning fish or the hatchlings: in the first case, the suspension would be implemented before and during the breeding period, and in the second case afterwards. Furthermore, the suspension could be generic, i.e. based on the period which protects the most species.

Alternatively, awareness of the breeding periods and fishing areas where a given species is more likely to be caught at any time or at a certain time of year would enable the suspension to be managed by dividing the sea into well-defined areas, reported on nautical charts. Fishing in these areas could be banned at different periods in rotation, in relation to the species present, in order to safeguard their reproduction. This would enable the fishing industry to fish throughout the year while protecting the breeding activities of spawners.

The choice of objectives is fundamental, as it is impossible to protect all species present in the Adriatic Sea with only one suspension period. Once the criteria are chosen, it will be necessary to monitor the consistency of fish stocks in order to check the efficacy of the strategies used.

This paper provides the basic information needed to support decisions relating to the fast, scientific choice of suspension periods in the Adriatic Sea by simple consultation of calendar data. The contribution of a recognised scientific body with direct experience in this area would be desirable and indeed essential in choosing strategies to safeguard marine fauna and subsequent verification of the results achieved in maintaining fish stocks, as envisaged by current legislation.

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