

**ALMA MATER STUDIORUM  
UNIVERSITÀ DI BOLOGNA**

SCUOLA DI SCIENZE- CAMPUS DI RAVENNA

Corso di Laurea Magistrale in Biologia Marina

**Mappatura degli habitat bentonici delle aree di Burano e  
Torcello, con particolare attenzione alla componente  
macroalgale**

Tesi di laurea in Pianificazione e gestione dell'ambiente costiero

**Relatore**

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## Allegato 5:

BIOLOGY				
L1		L2	L3	L4
B1	Sessile epibenthos			
		1	Encrusting lichens and cyanobacteria	
				1
		1	Lichens	
				1
				2
				3
		2	Cyanobacteria	
				1
		2	Encrusting epifauna	
		1	Serpulidae, sponges, <i>Spondylus gussonii</i> , <i>Novocrania anomala</i>	
		3	Macroalgal assemblages	
		1	Canopy forming	
				1
				2
				3
				4
				5
		2	Brached/fleshy/bushy-like	
				1
				2
				3
				4
				5
				6
				7
				8
				9
				10
				11
		3	Turf forming	
				1

			2	<i>Gelidium spp., Ulva rigida</i>
			3	<i>Ceramium</i>
			4	<i>Gelidium</i>
	4	Filamentous		
			1	<i>Cladophora spp.</i>
			2	<i>Chaetomorpha spp.</i>
			3	<i>Porphyra, Bryopsis</i>
	5	Sheet		
			1	<i>Enteromorpha spp.</i>
			2	<i>Ulva spp., Prasiola stipata</i>
			3	<i>Cladophora , Ulva rigida, Ulva intestinalis, Gelidium</i>
			4	<i>Callithamnium</i>
	6	Encrusting algae		
			1	<i>Lithophyllum spp.</i>
			2	<i>Neogoniolithon brassica-florida/Pseudolithoderma adriaticum</i>
	7	Trottoir forming		
4	Sponge assemblages			
	1	<i>Scalariispongia scalaris, Ircinia spp., Aplysina aerophoba, Chondrilla nucula</i>		
	2	<i>Mycale (Aegogropila) contarenii, Tedania (Tedania) anhelans</i>		
	3	<i>Agelas oroides, Chondrosia reniformis, Phorbastenia tenacior, Petrosia ficiformis, Spirastrella cunctatrix, Crambe crambe</i>		
	4	Demosponges		
			1	<i>Pachastrella, Poecillastra</i>
			2	<i>Phakellia ventilabrum</i>
			3	<i>Thenea muricata</i>
			4	Geodiidae
	5	Hexactinellides		
			1	<i>Asconema setubalense</i>
	6	Lithistids		
5	Cirripedes			
	1	<i>Chthamalus spp.</i>		
	2	<i>Balanus spp.</i>		
	4	<i>Semibalanus</i>		

		5	<i>Pollicipes pollicipes</i>			
		6	<i>Lepas</i> spp.			
		7	<i>Pachylasma giganteum</i> (Barnacles reef)			
	6	Cnidarian assemblages				
			1	Stony corals		
					1	<i>Cladocora</i>
					2	<i>Oculina</i>
					3	<i>Polycyathus</i>
					4	<i>Hoplangia durotrix</i>
					5	<i>Astroides</i>
					6	<i>Corynactis</i>
					7	<i>Leptopsammia</i>
					8	<i>Balanophyllia</i>
				9	<i>Madracis</i>	
				10	<i>Dendrophyllia cornigera</i>	
				11	<i>Madrepora</i>	
				12	<i>Desmophyllum</i>	
		13	<i>Lophelia</i> and <i>Madrepora</i>			
		2	Alcyonacean assemblages			
				1	<i>Eunicella</i> spp.	
				2	<i>Paramuricea</i> spp.	
				3	<i>Corallium rubrum</i>	
				4	<i>Alcyonium</i> spp.	
				5	<i>Viminella flagellum</i>	
				6	<i>Callogorgia verticillata</i>	
				7	<i>Ellisella paraplexauroides</i>	
				8	<i>Paralcyonium spinulosum</i>	
				9	<i>Phyllangia mouchezii</i>	
				10	<i>Leptogorgia sarmentosa</i>	
				11	<i>Swiftia pallida</i>	
				12	<i>Maasella</i>	
		13	<i>Ellisella paraplexauroides</i> , <i>Eunicella</i> spp., <i>Leptogorgia</i> spp., <i>Paramuricea clavata</i>			
		14	<i>Ellisella paraplexauroides</i> , <i>Viminella flagellum</i>			
		15	<i>Callogorgia verticillata</i>			
		16	<i>Corallium rubrum</i>			
		17	<i>Acanthogorgia hirsuta</i>			

			18	<i>Paralcyonium spinulosum</i> , <i>Alcyonium palmatum</i>
			19	<i>Muriceides lepida</i> , <i>Bebryce mollis</i> , <i>Villogorgia brevicoides</i>
			20	<i>Bebryce mollis</i>
			21	<i>Swiftia</i> spp.
			22	<i>Isidella elongata</i> (with <i>Aristeus antennatus</i> and <i>Aristeomorpha foliacea</i> )
			23	<i>Muriceides lepida</i>
			24	<i>Viminella flagellum</i>
		3	Zoanthid assemblages	
			1	<i>Parazoanthus</i> , <i>Epizoanthus</i>
		4	Antipatharian assemblages	
			1	<i>Anthipatella</i> spp.
			2	<i>Parantipathes larix</i>
			3	<i>Leiopathes glaberrima</i> , <i>Antipathella subpinnata</i>
			4	<i>Leiopathes glaberrima</i> , <i>Antipathella subpinnata</i> , <i>Parantipathes larix</i>
			5	<i>Leiopathes glaberrima</i> , <i>Antipathes dichotoma</i>
			6	<i>Leiopathes glaberrima</i> , <i>Antipathes dichotoma</i> , <i>Parantipathes larix</i>
		5	Actinarian assemblages	
			1	<i>Actinauge richardi</i>
			2	<i>Anemonia</i> , <i>Aiptasia</i> , <i>Actinia</i>
			3	Homathidae ( <i>Actinauge richardi</i> )
		6	Ceriantharia assemblages	
			1	<i>Cerianthus</i> spp.
			2	<i>Pachycerianthus</i> spp.
			3	<i>Aracnanthus oligopodus</i>
			4	<i>Arachnantus</i> , <i>Cerianthus</i> , <i>Pachycerianthus</i>
		7	Hyroid assemblages	
			1	<i>Macrorhynchia philippina</i>
			2	<i>Sertularella</i>
			3	<i>Eudendrium</i>
			4	<i>Lytocarpia</i>
			5	<i>Ectopleura</i>
			6	<i>Nemertesia</i> , <i>Sertularella</i>
		8	Hydrocorals (stylasterids)	

			1	<i>Errina aspera</i>
		9	Pennatulacean assemblages	
			1	<i>Pennatula rubra</i>
			2	<i>Veretillum</i> sp.
			3	<i>Funiculina quadrangularis</i>
			4	<i>Virgularia</i> sp., <i>Veretillum</i> sp., <i>Cavernularia</i> sp., <i>Funiculina</i> , <i>Pennatula</i> , <i>Pteroides</i>
			5	<i>Kophobelemnon stelliferum</i>
			6	<i>Funiculina quadrangularis</i> ( <i>Aporrhais serresianus</i> , <i>Nephrops norvegicus</i> , <i>Parapenaeus longirostris</i> )
			7	<i>Pennatula</i> spp.
		10	Mixed aggregation of stony corals and antipatharians	
			1	<i>Madrepora</i> , <i>Lophelia</i> , <i>Desmophyllum</i> , <i>Leiopathes/Antipathes</i>
		11	Mixed aggregation of stony corals, antipatharians and sponges	
			1	<i>Madrepora</i> , <i>Lophelia</i> , <i>Desmophyllum</i> , <i>Leiopathes/Antipathes</i> , <i>Pachastrella/Poecillastra</i>
		12	Mixed aggregation of stony corals, sponges and serpulids	
			1	<i>Madrepora</i> , <i>Desmophyllum</i> , <i>Pachastrella/Poecillastra</i> , <i>Serpula</i> , <i>Filograna</i>
		13	Mixed aggregation of stony corals and sponges	
			1	<i>Lophelia</i> , <i>Madrepora</i> , <i>Desmophyllum</i> , <i>Pachastrella/Poecillastra</i>
		14	Mixed aggregation of stony corals, antipatharians, alcyonaceans and sponges	
			1	<i>Madrepora</i> , <i>Lophelia</i> , <i>Leiopathes/Antipathes</i> , <i>Callogorgia</i> , <i>Pachastrella/Poecillastra</i>
			1	<i>Madrepora</i> , <i>Lophelia</i> , <i>Leiopathes/Antipathes</i> , <i>Corallium</i> , <i>Pachastrella/Poecillastra</i>
		15	Mixed aggregation of alcyonaceans and sponges	
			1	<i>Callogorgia verticillata</i> , <i>Pachastrella monilifera</i>

	7	Bryozoan assemblages		
			1	Branched
			1	<i>Myriapora truncata, Pentapora fascialis, Reteporella grimaldi</i>
			2	<i>Amanthia verticillata</i>
			3	<i>Kinetoskias</i> sp.
			2	Encrusting
			1	<i>Schizomavella, Schizoporella</i>
	8	Polychaete assemblages		
			1	Sabellids
			1	<i>Branchiomma</i> spp., <i>Sabella</i> spp., <i>Myxicola, Megalomma</i>
			2	Terebellids
			1	<i>Lanice conchilega</i>
	9	Brachiopod bed		
			1	<i>Megerlia truncata</i>
			2	<i>Gryphus vitreus</i>
		3	<i>Megerlia truncata, Neocrania anomala, Argyrotheca</i> spp.	
10	Tunicate assemblages			
		1	<i>Ciona</i> spp.	
		2	<i>Phallusia</i> spp.	
		3	<i>Polyandrocarpa zorritensis</i>	
		4	<i>Clavelina</i> spp.	
		5	Didemnids	
11	Mollusc reef/bed/belt			
		1	Oyster reef	
		1	<i>Ostrea edulis</i>	
		2	<i>Crassostrea</i> spp.	
		3	<i>Neopycnodonte cochlear</i>	
		4	<i>Spondylus spinosus</i>	
		5	<i>Chama pacifica</i>	
		6	<i>Neopycnodonte zibrowii</i>	
		2	Mussel bed/belt	
		1	<i>Mytilus</i> spp.	
		2	<i>Brachidontes pharaonis</i>	
		3	<i>Modiolula phaseolina</i>	
		4	<i>Mytilaster</i> spp.	

			5	<i>Mytilus galloprovincialis</i>
		3	Pen-shell bed	
			1	<i>Pinna nobilis</i>
			2	<i>Atrina fragilis</i>
		4	Scallop bed	
			1	<i>Flexopecten glaber</i>
		5	Vermetid reef	
			1	<i>Dendropoma</i> spp.
	12	Polychaete bioconstruction		
		1	Serpulid reef	
			1	<i>Ficopomatus enigmaticus</i>
		2	Sabellarids	
			1	<i>Sabellaria alveolata</i>
			2	<i>Sabellaria spinulosa</i>
	13	Seagrass meadow		
		1	<i>Posidonia oceanica</i>	
		2	<i>Cymodocea nodosa</i>	
		3	<i>Zostera</i> spp.	
			1	<i>Zostera marina</i>
			2	<i>Zostera noltii</i>
		4	<i>Halophila stipulacea</i>	
		5	<i>Ruppia</i> spp.	
			1	<i>Ruppia cirrhosa</i>
			2	<i>Ruppia maritima</i>
		6	<i>Potamogeton pectinatus</i>	
		7	<i>Zannichellia palustris</i>	
		8	<i>Zostera marina, Zostera noltii, Zannichellia palustris</i>	
	14	Coralligenous		
		1	Encrusting sponge assemblages	
			1	<i>Phorbastenacior, Spirastrella cuctatrix, Crambe crambe</i>
			2	<i>Pleraplysilla spinifera</i>
		2	Massive/erect sponge assemblages	
			1	<i>Axinella</i> spp., <i>Dysidea avara</i>
			2	<i>Spongia lamella</i>
			3	<i>Aplysina cavernicola</i>



			4	<i>Agelas oroides, Petrosia ficiformis</i>
		3	Alcyonacean assemblages	
			1	<i>Paramuricea clavata</i>
			2	<i>Eunicella</i> spp.
			3	<i>Corallium rubrum</i>
			4	<i>Ellisella paraplexauroides, Eunicella</i> spp., <i>Leptogorgia</i> spp, <i>Paramuricea clavata</i>
			5	<i>Alcyonium acaule</i>
		4	Stony corals	
			1	<i>Cladocora caespitosa</i>
			2	<i>Thalamophyllia gasti</i>
			3	<i>Leptopsammia pruvoti</i>
			4	<i>Madracis pharensis</i>
			5	<i>Hoplangia durotrix, Polycyathus muelleriae,</i> <i>Phyllangia americana mouchezii</i>
			6	<i>Pourtalosmia anthophyllites</i>
		5	Antipatharian aggregations	
			1	<i>Antipathella</i> sp.
		6	Zoanthid aggregations	
			1	<i>Parazoanthus axinellae</i>
			2	<i>Savalia savaglia</i>
		7	Hydrozoans	
			1	<i>Sertularella, Eudendrium, Macrorhynchia</i>
		8	Algae assemblages	
			1	<i>Halimeda tuna, Flabellia petiolata</i>
			2	<i>Halopteris filicina</i>
			3	<i>Halymenia floresia</i>
			4	<i>Cystoseira</i> spp.
			5	<i>Laminaria</i> spp.
			6	<i>Mesophyllum</i> spp., <i>Lithophyllum</i> spp., <i>Peyssonelia</i> spp.
			7	<i>Ptilophora mediterranea</i>
		9	Serpulid assemblages	
			1	<i>Filograna implexa, Salmacina dysteri</i>
		10	Bryozoan assemblages	
			1	<i>Myriapora truncata</i>
			2	Big bryozoans ( <i>Pentapora</i> spp., <i>Reteporella</i> spp., <i>Schizoporella</i> spp., <i>Schizomavella</i> spp.)

		11	Ascidian assemblages		
				1	Solitary ascidians
				2	Colonial ascidians
		12	Mixed algal and invertebrate assemblages		
				1	Mytilus, <i>Cystoseira</i> spp.
				2	Mytilus, <i>Ceramium virgatum</i>
		13	Mixed invertebrate assemblages		
	15	Specialized/chemosymbiotic macrofauna			
		1	Gastropods, bivalves, Isopods, vestimentiferans		
				1	Cocculinoform limpets, <i>Idas</i> spp., Pholadidae, Teredinae, <i>Limnoria</i> , <i>Lamellibrachia</i>
		2	Gastropods, bivalves, vestimentiferans		
				1	Cocculinoform limpets, <i>Idas</i> spp., <i>Lamellibrachia</i>
		3	Gastropods, bivalves, decapods		
				1	<i>Lurifax</i> , <i>Taranis</i> , Thyasiridae, Lucinidae, Callianassidae
	16	Chemosymbiotic macrofauna			
		1	Bivalves, vestimentiferans		
				1	Thyasiridae, Lucinidae, <i>Lamellibrachia</i>
		2	Vestimentiferans		
				1	<i>Lamellibrachia</i>
		3	Bivalves, vestimentiferans		
	17	Mixed aggregation of algae and sponges			
	18	Mixed aggregation of algae, oyster and sponges			
	19	Mixed aggregation of algae, sponges, polychaetes and ophiuroids			
B2	Benthopleustophytes				
	1	Rhodolith bed (including maerl)			
		1	<i>Phymatolithon calcareum</i> and <i>L. corallioides</i>		
		2	<i>Lithothamnion</i> spp., <i>Lithophyllum</i> spp.,		

			<i>Spongites</i> spp., <i>Neogoniolithon</i> spp., <i>Mesophyllum</i> spp.	
	2	Green algae		
			1 <i>Chaetomorpha</i> spp., <i>Enteromorpha</i> spp., <i>Cladophora</i> spp.	
			2 <i>Anadyomene stellata</i>	
	3	Red algae		
			1 <i>Rytiphloea tinctoria</i>	
B3	Vagile epibenthos			
	1	Macroforaminifera bed		
			1 <i>Amphistegina</i> sp.	
	2	Echinoderms		
			1 <i>Antedon</i> spp.	
			2 <i>Leptometra phalangium</i>	
			3 Ophiuroids	
			4 Holoturians	
			5 <i>Cidaris cidaris</i>	
			6 <i>Arbacia lixula/Paracentrotus lividus</i>	
			7 <i>Diadema</i> sp.	
			8 <i>Centrostephanus longispinus</i>	
			9 Holothurioidea ( <i>Mesothuria intestinalis</i> , <i>Eostichopus regalis</i> , <i>Elasipodida</i> )	
			10 <i>Bryssopsis lyrifera</i> , other echinoids	
			11 <i>Leptometra phalangium</i>	
			12 Solemyidae, <i>Idas</i> sp., Thyasiridae, Lucinidae ( <i>Lucinoma kazani</i> , <i>Myrtea</i> <i>amorpha</i> ), <i>Isorropodon perplexum</i> , <i>Lamellibranchia</i>	
	3	Gastropods		
			1 <i>Patella</i> spp., <i>Cellana rota</i>	
			2 Trochids	
				1 <i>Osilinus</i> spp., <i>Gibbula</i> spp.
			3 Littorinids	
				1 <i>Melaraphe neritoides</i>
				2 <i>Echinolittorina punctata</i>
			4 Hydrobiids	
			5 Cerithids	
				1 <i>Rhinoclavis kochi</i> , <i>Cerithium scabridum</i> ,

					<i>Cerithidium diplax</i>
		6	Muricids		
		7	Strombids		
				1	<i>Conomurex decorus</i>
		8	Ellobids		
	4	Decapods			
		1	Grapsoids		
		2	<i>Diogenes</i>		
B4	Infauna				
	1	Polychaetes			
		1	<i>Hyalinoecia tubicola</i>		
		2	<i>Ditrupa arietina</i>		
		3	<i>Lanice conchilega</i>		
		4	<i>Glycera</i> spp.		
		5	<i>Arenicola</i> spp.		
		6	<i>Pomatoceros triqueter</i>		
		7	<i>Scolelepis, Pontocrates, Eurydice</i>		
		8	<i>Hediste diversicolor</i>		
		9	<i>Lanice conchilega</i>		
	2	Bivalves			
		1	<i>Lithophaga lithophaga</i>		
		2	<i>Donacilla cornea</i>		
		3	<i>Cerastoderma glaucum</i>		
		4	Lymnocardine spp.		
		5	<i>Scrobicularia</i> spp.		
		6	<i>Abra ovata</i>		
		7	Venerids ( <i>Chamelea gallina, Lentidium mediterraneum, Venerupis philippinarum</i> )		
		8	<i>Donax trunculus</i>		
		9	<i>Abra longicallus</i> , other molluscs		
	3	Gastropods			
		1	<i>Turritella</i> spp.		
	4	Molluscs, polychaetes, crustaceans			
		1	<i>Cerastoderma glaucum, Abra tenuis, Chamelea gallina, Tapes</i> spp., <i>Anadara kagoshimensis, Spisula, Mactra</i>		
		2	<i>Tellina</i> spp., <i>Donax</i> spp., <i>Lentidium</i>		

			<i>mediterraneum, Globivenus effossa, Mya arenaria, Solenidae, Cyclope neritaea, Loripes lucinalis, Owenia fusiformis</i>	
		3	Scaphopods	
		4	<i>Chamelea gallina, Tellina tenuis, Spisula subtruncata</i>	
		5	<i>Protodorvillea kefersteini, Gouldia minima, Branchiostoma lanceolatum</i>	
		6	<i>Calyptraea chinensis, Prionospio cirrifera, Heteromastus filiformis</i>	
		7	<i>Nephtys hombergii, Abra prismatica, Pitar rudis, Mytilus galloprovincialis</i>	
	5	Burrowing crustaceans		
		Decapods		
		1	<i>Callinassa truncata, Calliax spp., alpheids, upogebids</i>	
		2	<i>Nephrops norvegicus</i>	
	6	Echinoderms		
		1	<i>Echinocardium cordatum</i>	
		2	<i>Brissopsis lyrifera</i>	
		3	<i>Spatangus purpureus</i>	
	7	Chordata		
		1	<i>Branchiostoma lanceolatum</i>	
	8	Polychaetes and crustaceans		
	9	Molluscs and polychaetes		
	10	Mixed aggregation of polychaetes and algae		
B5	Unknown			