

SAKURA Online Practical Course

“Introduction to Marine Biodiversity”



Date: 1st March, 2022

* The individual times are in JST timezone (Tokyo, UTC+9).

Zoom Information

Topic: SAKURA Online Practical Course

Time: Mar 1, 2022 12:00-

Meeting ID: 999 2365 1764

Passcode: 232220

- Please turn on your video camera during this program unless any network trouble occurs.
- Please mute your microphone unless you have something to speak (self-introduction, questions or comments).

Program

1st March (Tue)

- 12:00-12:05 Opening
- 12:05-13:05 Introduction of each institute (SMBS, BAU, CVASU, HNUE)
- 13:05-13:15 Group photo, break
- 13:15-14:15 Self-introduction of each participant (1 minute talk*)
- 14:15-14:25 break
- 14:25-16:30 Online course “Diversity of marine animals in Sado Island”
 - Lectures about biodiversity of marine animals
 - Live streaming for introducing marine animals of Sado Island
- 16:30-16:40 break
- 16:40-17:40 Online course “Development of sea urchin embryo” (real-time and video)
- 17:40-17:45 Closing

* Please introduce yourself with your name, institute, grade or title, and your summary (academic interests, and favorite marine organisms, etc...).

Questionnaires

To improve future programs, please fill out the questionnaire form on the following site after attending this program.

- <https://forms.gle/YLsRECGzNzfHJ8QE9>

Participant List

	University	Name	Grade/ Title
1	BAU	Md Shahjahan	Professor
2	BAU	Farzana Hossain	Doctoral Student
3	BAU	Md Kabir Hossain	Doctoral Student
4	BAU	Zannatul Ferdous	Doctoral Student
5	BAU	Jabed Hasan	MS Student
6	BAU	Fouzia Fariha	MS Student
7	CVASU	Md. Mahiuddin Zahangir	Associate Professor
8	CVASU	Nayeema Ferdaushy Hoque	Assistant Professor
9	CVASU	Shifat Ara Noor	MS Student
10	CVASU	Antar Sarker	Undergraduate Student
11	CVASU	Fahmida Ali Ria	Undergraduate Student
12	HNUE	Nguyen Lan Hung Son	Dean / Associate Professor
13	HNUE	Tran Duc Hau	Associate Professor
14	HNUE	Do Nguyen Nguyen Phuong	Undergraduate Student
15	HNUE	Dang Thi Thanh Huong	Undergraduate Student
16	HNUE	Nguyen Tran Quy Duy	Undergraduate Student
17	HNUE	Ha Huy Cong	Undergraduate Student
18	HNUE	Nguyen Truong Toan	Undergraduate Student
19	HNUE	Nguyen Manh Long	Undergraduate Student
20	HNUE	Nguyen Thị Thuy Trang	Undergraduate Student
21	HNUE	Nguyen Hoai Manh Hung	Undergraduate Student
22	HNUE	Nguyen The Phuong	Undergraduate Student
23	HNUE	Nguyen Ngoc Khanh Linh	Undergraduate Student
24	HNUE	Vo Thi Hong Ngoc	Undergraduate Student
25	HNUE	Do Bach Duong	Undergraduate Student
26	TU	Sarika Otsuka	Undergraduate Student
27	SMBS	Hironori Ando	Professor
28	SMBS	Midori Iida	Associate Professor
29	SMBS	Akihito Omori	Assistant Professor
30	SMBS	Kenji Toyota	Assistant Professor
31	SMBS	Toyokazu Shimotani	Technical Assistant
32	SMBS	Parvez Chowdhury	Research Student
33	SMBS	Kosuke Natsukawa	MS Student
34	SMBS	Itsuki Umeta	MS Student
35	SMBS	Kentaro Shimada	MS Student
36	SMBS	Arisa Osabe	Undergraduate Student

BAU: Bangladesh Agricultural University, Bangladesh

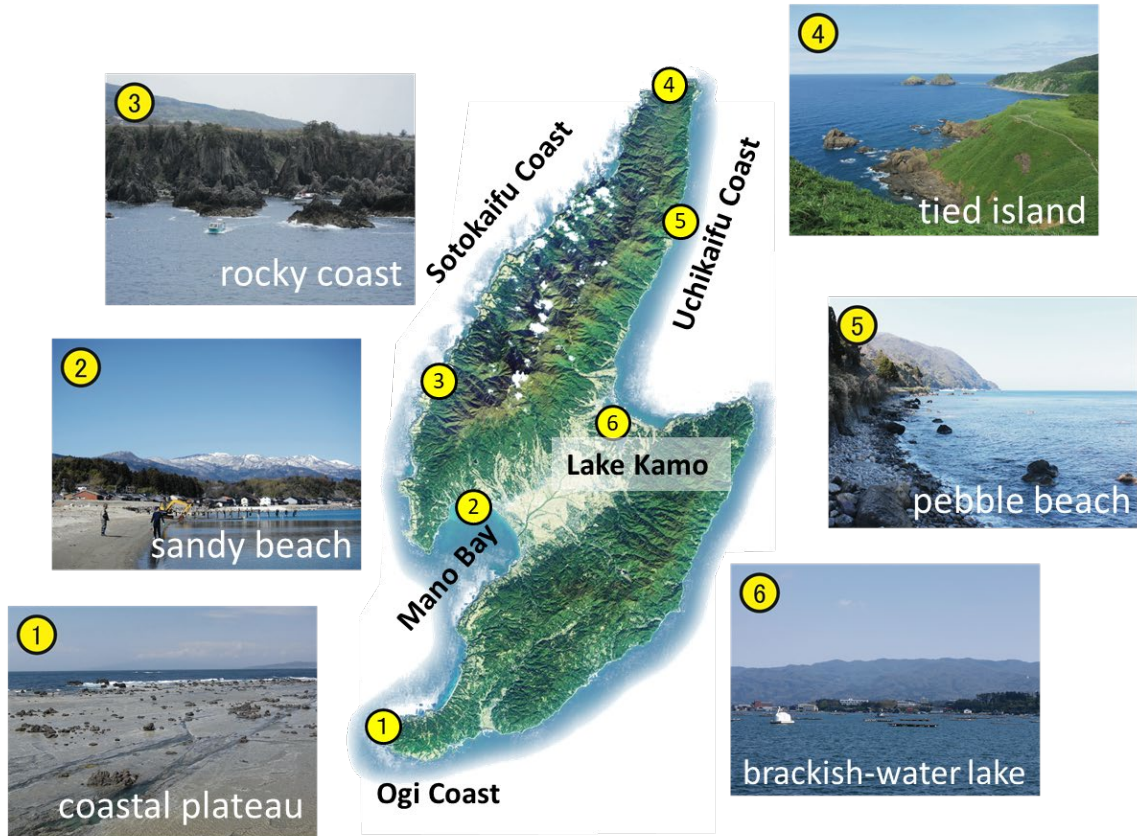
CVASU: Chittagong Veterinary and Animal Sciences University, Bangladesh

HNUE: Hanoi National University of Education, Vietnam

TU: Tohoku University, Japan

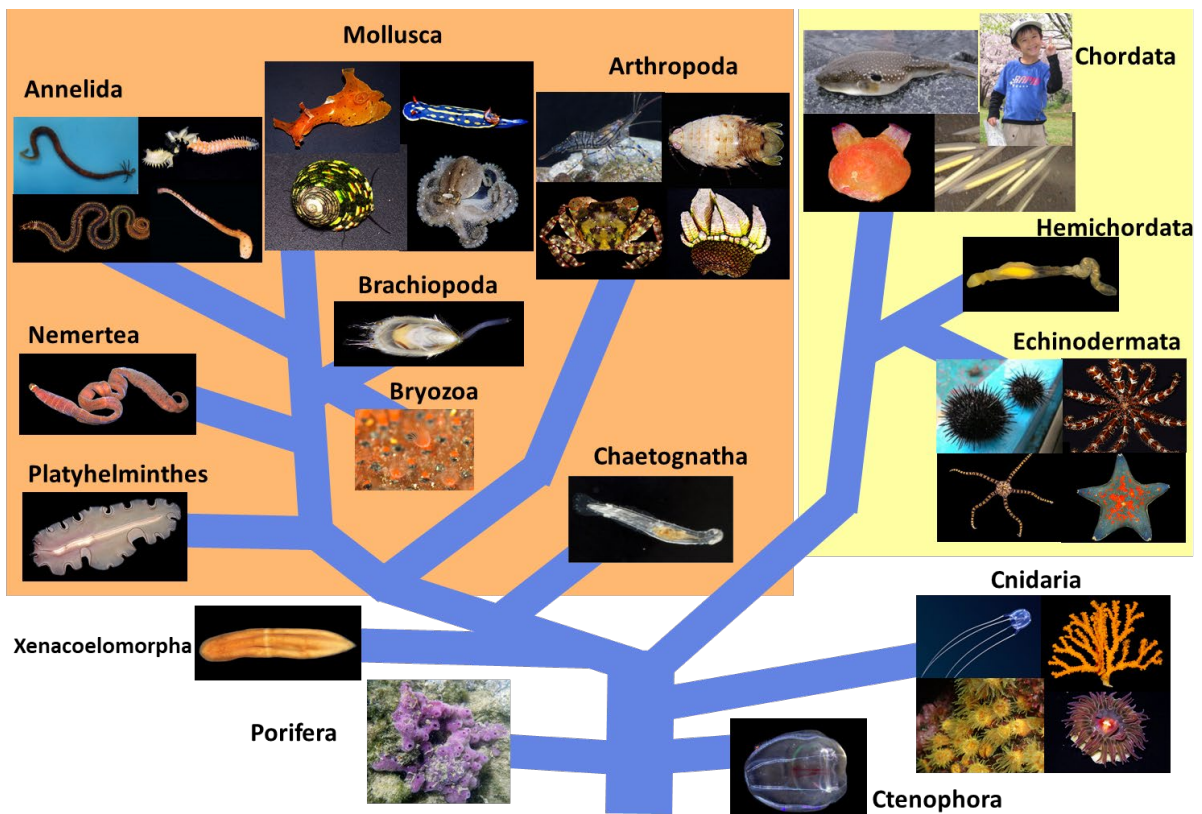
SMBS: Marine Biological Station, Sado Island Center for Ecological Sustainability, Niigata University, Japan

Geographical Features of Sado Island



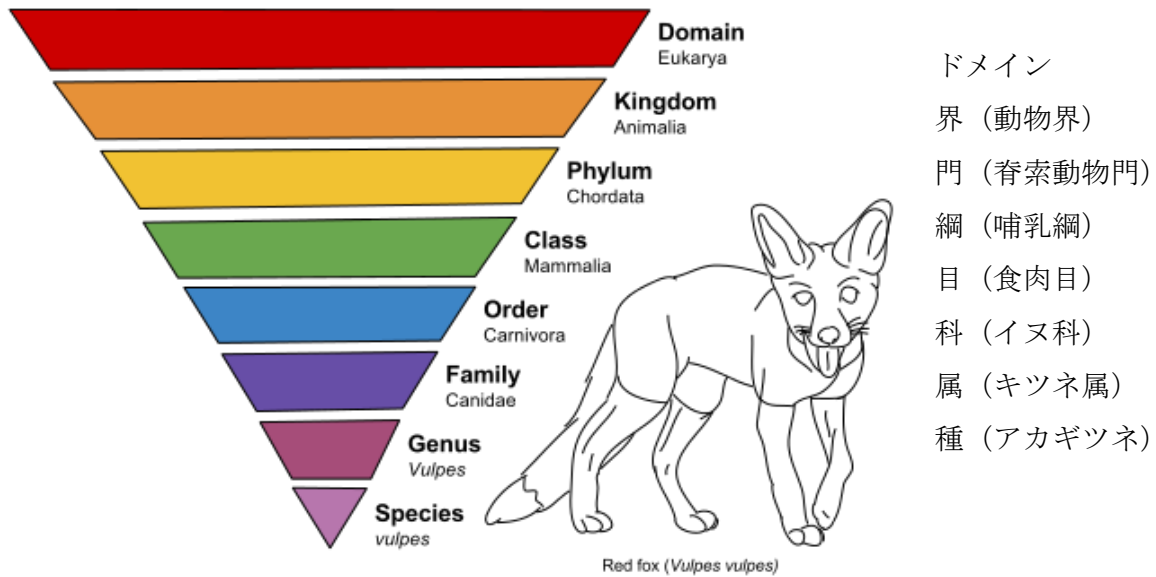
Various environments → Various animals that adapt each environment

Phylogenetic tree of the animals



Name of organisms

1. Taxonomic rank (分類階級)



2. Phyla and English and Japanese names of typical animals in each phylum

1. Phylum Porifera (海綿動物門)	Sponges (カイメン)
2. Phylum Cnidaria (刺胞動物門)	Jellyfish (クラゲ)、Sea anemones (イソギンチャク) Hydras (ヒドラ)、Corals (サンゴ)
3. Phylum Ctenophora (有櫛動物門)	Comb jellies (クシクラゲ、ウリクラゲ)
4. Phylum Platyhelminthes (扁形動物門)	Flat worms (ヒラムシ)、Planarians (プラナリア)、Tapeworms (条虫)
5. Phylum Nemertea (紐形動物門)	Ribbon worms (ヒモムシ)
6. Phylum Bryozoa (外肛(苔虫)動物門)	Bryozoans (コケムシ)
7. Phylum Annelida (環形動物門)	Polychaetes (ゴカイ)、Earthworms (ミミズ)、Leeches (ヒル)、Tubeworms (チューブワーム) Peanut worms (ホシムシ)
8. Phylum Mollusca (軟体動物門)	<u>Class Gastropoda (腹足綱)</u> : Sea snails (巻貝)、Limpets (カサガイ)、Sea slugs (ウミウシ)、Sea hares (アメフラシ)、Abalones (アワビ)、Turbo (サザエ) <u>Class Cephalopoda (頭足綱)</u> : Squid (イカ)、Cuttlefish (コウイカ)、Octopus (タコ) <u>Class Bivalvia (二枚貝綱)</u> : Mussels (イガイ)、Oysters (カキ)、Scallops (ホタテガイ) <u>Class Polyplacophora (多板綱)</u> : Chiton (ヒザラガイ)
9. Phylum Nematoda (線形動物門)	Nematodes (センチュウ)、Stomach worms (回虫)

10. Phylum Arthropoda (節足動物門)	<p>Subphylum Crustacea (甲殻亜門) : Shrimps (小エビ)、Prawns (クルマエビ)、Lobsters (イセエビ)、Crabs (カニ)、Hermit crabs (ヤドカリ)、Barnacles (フジツボ)、Goose barnacles (カメノテ)、Wharf roach (フナムシ)、Skeleton shrimp (ワレカラ)、Gammaridean amphipod (ヨコエビ)</p> <p>Subphylum Chelicerata (鋏角亜門) : Sea spiders (ウミグモ)、Spiders (クモ)、Scorpions (サソリ)、Horseshoe crabs (カブトガニ)</p> <p>Subphylum Myriapoda (多足亜門) : Centipedes (ムカデ)、Millipedes (ヤスデ)</p> <p>Subphylum Hexapoda (六脚亜門) : Insects (昆虫)</p>
11. Phylum Echinodermata (棘皮動物門)	Sea urchins (ウニ)、Starfishes (ヒトデ)、Brittle stars (クモヒトデ)、Sea cucumber (ナマコ)
12. Phylum Hemichordata (半索動物門)	Acorn worms (ギボシムシ)
13. Phylum Chordata (脊索動物門)	<p>Subphylum Cephalochordata (頭索動物亜門) : Lancelet (ナメクジウオ)</p> <p>Subphylum Tunicata (尾索動物亜門) : Sea squirts (ホヤ)、Salps (サルパ)</p> <p>Subphylum vertebrata (脊椎動物亜門) : Cartilaginous fish (軟骨魚類)、Bony fish (硬骨魚類)、Frogs (カエル)、Sea turtles (ウミガメ)、Snakes (へび)、Birds (トリ)、Dolphins (イルカ)、Monkeys (サル)</p>

3. Planktons

1. Phylum Dinoflagellata (渦鞭毛虫門)	Genus <i>Peridinium</i> (オビムシ)、Genus <i>Ceratium</i> (ケラチウム、ツノモ)、Genus <i>Noctiluca</i> (ヤコウチュウ)
2. Phylum Radiolaria (放射虫門)	Radiolaria (放射虫)
3. Phylum Ochrophyta (不等毛植物門)	Diatoms (珪藻)
4. Phylum Arthropoda (節足動物門)	Copepods (コペポータ)、Nauplius (ノープリウス幼生 : larva of shrimps, crabs, barnacles)
7. Phylum Mollusca (軟体動物門)	Trochophore and Nectochaeta larva (トロコフオア、ネクトケータ幼生 : larva of Polychaetes)、Trochophore and Veliger larva (トロコフオア、ベリジャー幼生 : larva of Gastropoda and Bivalvia)
8. Phylum Echinodermata (棘皮動物門)	(Echino)pluteus larva ((エキノ)プルテウス幼生 : larva of sea urchins)
9. Phylum Chaetognatha (毛顎動物門)	Arrow worms (ヤムシ)
10. Phylum Chordata (脊索動物門)	Larvaceans (オタマボヤ)、Doliolum (ウミタル)

Observation of the development of sea urchin

=Materials=

Hemicentrotus pulcherrimus (Japanese green sea urchin) (Fig. 1)

10 mM Acetylcholine Chloride (ACh)	Syringe
Filtered seawater (FSW)	Disposable dropper
50 mL and 1.5 mL plastic tubes	Hole slide glass
Glass or plastic dish	Cover glass
Plastic tray	Binocular microscope



Fig. 1: *H. pulcherrimus*

=Methods=

1. Fill 50 mL plastic tubes with FSW.
2. Rinse an adult sea urchin with tap water briefly.
3. Inject 1 ml of 10 mM ACh into the adult sea urchin by syringe (see Fig. 2).
4. Place the ACh-injected sea urchin on the plastic tray and wait for spawning.
5. If the injected specimen was male, place the urchin on a dry dish **with the oral side up**. If the injected specimen was female, place the urchin on FSW-filled 50 mL tube **with the oral side up**.
6. After the finish of spawning, remove the urchin from the dish or tubes.
7. Collect the semen into a 1.5 mL plastic tube and place it on ice.
8. Wash the eggs 1-2 times by gently decanting supernatant and replace it with fresh FSW.
9. Put one or two drops of the unfertilized eggs on a hole slide glass, then overlay a cover glass. Observe the unfertilized eggs under the binocular microscope.
10. Dilute the sperms with FSW, and place one drop of the diluted sperms on the edge of the cover glass of the slides (Fig. 3). Observe the fertilization under the binocular microscope.



Fig. 2: Where to inject ACh

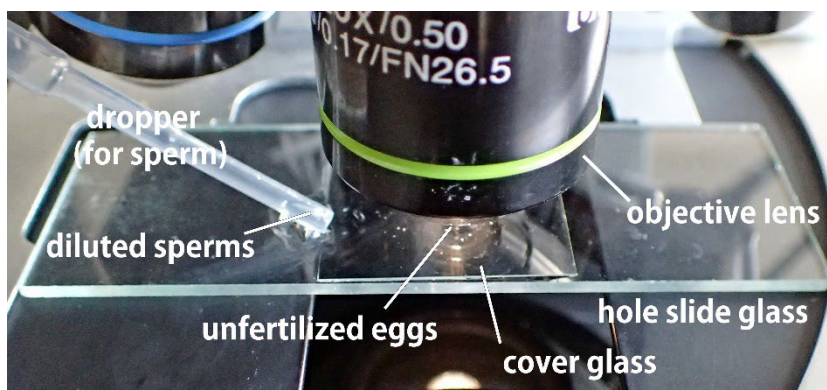


Fig. 3: A photograph of how to observe the fertilization. **Please extremely be careful not to dip the tip of objective lens in the diluted sperms.**

11. Put one or two drops of the diluted sperms in the 50 mL tube for fertilization of the remaining eggs.
12. Wash the eggs 1 time by gently decanting supernatant and replace it with fresh FSW.
13. Transfer the fertilized eggs to the large container and add the fresh FSW.
14. Keep the container at 13-17°C. Observe the development by making slides of each stages.

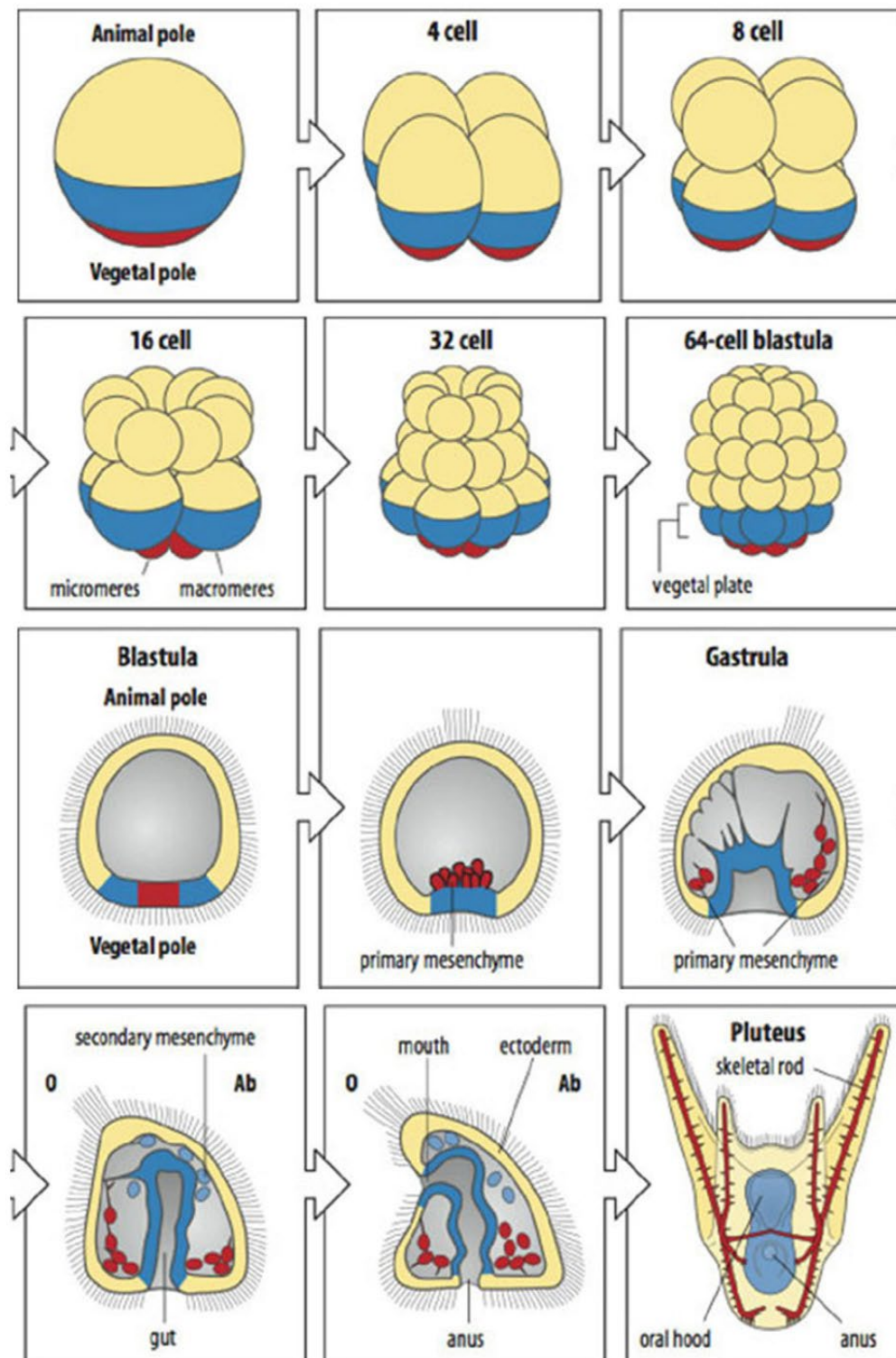


Fig. 4: Normal development of a sea urchin (from Green and Batteman 2016)

Reference Websites & Videos

- ◆ Marine Biological Station, Sado Island Center for Ecological Sustainability, Niigata University (SMBS)
<https://www.sc.niigata-u.ac.jp/sc/sadomarine/english/index.html>

- ◆ Marine Life of Sado Island
<https://www.sc.niigata-u.ac.jp/sc/sadomarine/english/pictures.html>

* Following videos are the unlisted (non-public) videos. Please DO NOT share the links below on any social media, blogs, or websites.

- Introduction of Marine Biological Courses at SMBS
<https://youtu.be/Ds9SPyA2T3k>

- Collection of Marine Animals at Rocky Beach
<https://youtu.be/YN1Fxz2RsHA>

- Collection of Marine Animals at Sandy Beach
<https://youtu.be/pV58OXuL97E>

- Quantitative Survey of Marine Organisms using Quadrats
<https://youtu.be/xUITZMG6Mi4>

- Observing Fertilization and Normal Development of Sea Urchin
https://youtu.be/5_bWFC20ZMw

- Marine Invertebrates of Sado Island
<https://youtu.be/6TTIkVH6JrQ>

Marine Biological Station,
Sado Island Center for Ecological Sustainability,
Niigata University (SMBS)

Address: 87 Tassha, Sado, Niigata 952-2135, Japan
Tel: +81-259-75-2012 Fax: +81-259-75-2870
URL: <https://www.sc.niigata-u.ac.jp/sc/sadomarine/>