

## What the Coelacanth Claim? A Significance of In-Situ Conservation

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**ABSTRACT:** There are two species of coelacanth in the world. African coelacanth, *Latimeria chalumnae*, distributed in the huge area of the east coast of the African continent and islands in front of the continent in the Indian Ocean. On the other hand, Indonesian coelacanth, *L. menadoensis*, has been found in few regions in Indonesian waters.

Aquamarine Fukushima, Marine Science Museum has conducted field surveys in Indonesia since 2005 and found a new habitat in Sulawesi Island and a small island located in the north-west of the New Guinea Island. These activities are collaborated with the Indonesian Institute of Sciences as a national scientific academy and the Sam Ratulangi University as a local academy.

Just eight specimens of the Indonesian coelacanth were caught while more than 300 African coelacanth specimens exist. The ecology of the Indonesian coelacanth is still unknown. The local government and economic markets utilize the Indonesian coelacanth as an icon of conservation or sightseeing industry, but it has not succeeded yet because it is difficult to find them which inhabit deep water of more than 150m. Therefore, their conservation is not active yet.

Indonesian Institute of Sciences plans to construct a conservation center for the Indonesian coelacanth, and the Aquamarine Fukushima involves in this project by constructing a small supporting facility. Understanding their life history and distribution is one of the key information to protect the coelacanth.

### INTRODUCTION

The first coelacanth, *Latimeria chalumnae*, was discovered in South Africa in 1938, and then the second one was captured in Comoros in 1952 (Smith, 1939, 1953). Indonesian coelacanth, *L. menadoensis*, was discovered in Manado, where it was located in the north of Sulawesi Island, Indonesia in 1997. Then, the first specimen was captured in 1998 (Erdmann *et al.*, 1998). According to the genetic study, the specimen differed from those of African species *L. chalumnae* (Pouyaud *et al.*, 1999). Two individuals were observed by submersible in a location, 360 km away from Manado in 1999 (Fricke *et al.* 2000). Aquamarine Fukushima, Indonesian Institute of Sciences, and Sam Ratulangi University have conducted coelacanth research surveys in Indonesia (Iwata *et al.* 2019). Off the northern coasts of Sulawesi Island and Biak Island which is located in the north west of the New Guinea Island, it was confirmed that *L. menadoensis* inhabited by the Remotely Operated Vehicle (ROV) observations. In this paper the summaries of the surveys and their results are described.

### COELACANTH SURVEYS

#### ROV surveys

The surveys were conducted in the Sulawesi Island and the Biak Island (Fig. 1). They started from 2005. Table 1 shows survey periods and areas from 2005 to 2015. Total of 14 surveys were conducted.

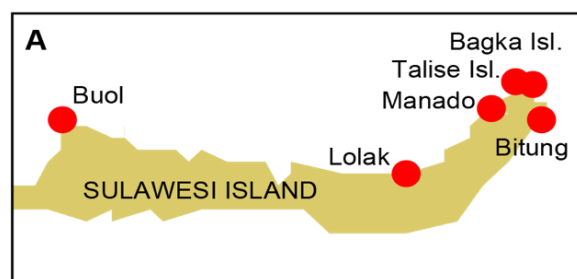


Fig. 1. Localities of the Indonesian coelacanth survey using ROV from 2005 to 2015.

ROVs which were able to dive to the depth of 300 m were used for the surveys. The ROV has two vertical, two horizontal and two right-left propellers, and it was controlled from a boat on surface through a 400 m long tether cable. During the field surveys by ROV recording for Indonesian coelacanths, *Latimeria menadoensis*, from 2005 to 2015, 33 individuals were recorded. Out of them, 30 different individuals were identified and three others were unidentified. Among those, six individuals were observed more than twice. All individuals observed more than twice were encountered in the same area, at locations close from each other within hundreds of meters.

When individuals of *L. menadoensis* were observed, some of them stayed stationary at the same place, but some individuals swam away. It seemed that they tried to avoid and escape from the brightness of the light or the sounds of the propellers of the ROV.

Table 1. Periods and areas of the *Latimeria menadoensis* survey using ROV

No.	Date	Survey Area
1	17/04/2005 – 30/04/2005	Manado-tua Isl. and other islands
2	06/05/2006 – 19/05/2006	Northern coast of Sulawesi
3	27/05/2006 – 05/06/2006	Buol
4	11/12/2006 – 20/12/2006	Buol
5	27/06/2007 – 05/07/2007	Manado
6	09/07/2007 – 12/07/2007	Buol
7	02/12/2008 – 08/12/2008	Talise and Bangka Isl.
8	12/09/2009 – 09/10/2009	Talise and Bangka Isl. Manado
9	06/11/2010 – 16/11/2010	Biak Island
10	05/12/2010 – 18/12/2010	Manado
11	02/05/2012 – 13/05/2012	Manado
12	03/06/2013 – 10/06/2013	Manado
13	19/05/2015 – 30/05/2015	Bitung, Lolak
14	30/10/2015 – 16/11/2015	Bitung, Lolak

#### Ingestion of plastic material by coelacanth

Eight specimens of *L. menadoensis* are recorded in recent time in Indonesia. All individuals except the last specimen were caught within Sulawesi Island. The first one was just photographed, and the second specimen was preserved as the type specimen.

All of captured coelacanths were reported to the Coelacanth Conservation Committee. Each specimen has an own CCC number. The sixth Indonesian specimen (Fig. 2A), CCC 287, was

caught by line fishing in July 22, 2011 off Tatapaan Island located in Amurang Bay of Sulawesi Island, Indonesia. When it was caught, the fisherman brought it to the local fishery office in Amurang, and it was stored in a freezer for 10 months. It was dissected on May 22 in 2012. Total length of the specimen CCC 287 was 112 cm. It was thin, and the body weight was only 13.1 kg. The eyes were subsided, and we found two pieces of plastic in the stomach. One was a snack bag of potato chips which was 25 cm x 19.5 cm, and another one was a piece of a white plastic bag which was 20 cm x 11 cm (Fig. 2B). There was nothing except them in the stomach.



Fig. 2. Individual (A) and ingested plastic litters (B).

#### Conservation of the Indonesian coelacanth

According to interviews to fishermen who have caught *Latimeria menadoensis* by line fishing in Indonesia, they were still alive at moments just caught. The water temperature of the surface is usually more than 30 °C which is drastically higher than that of the coelacanth habitat. It causes more serious damage to the fish than the change of pressure because the swim bladder of the coelacanth is fat-filled (Powel *et al.* 2002). Therefore, we are considering to build rescue and study facilities for coelacanth and deep sea fish. In these facilities aquarium tanks which provide cold water environment will be set, and if coelacanths or other deep sea fish are caught, they will be stored in and rehabilitated. Breeding data during rescue is not only expected to bring new knowledges about their life history, but it could also be one of the key information to protect the coelacanth.

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Fig. 3. A conservation plan is collaborated between Aquamarine Fukushima, Indonesian Institute of Sciences, and Sam Ratulangi University. Our focus is to construct facilities to rescue and study coelacanths in-situ. A: Ongoing research facility in Lolak. B: Coelacanth Conservation Center in Bitung.