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The opportunity of using the ROV for better management of *Corallium rubrum* and for the safety of workers

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Evolution of the practice of fishing for coral

In the early '60s the professional underwater fishing of red coral began, initially at a depth ranging from 30m to -70 m .
Since 1989 , in Sardinia only manual harvesting has been allowed by professional fishermen with ax and net, equipped with underwater apparatus, autonomous or not.
From a technological point of view, this practice has gradually evolved with the adoption of new materials and respiratory mixtures, but from a procedural point of view it hasn't changed. Moreover the work depths have dramatically increased (over 80 m): between 100 m and 140 m depth according to the constraints imposed by the Sardinian law.
Besides we dive, without any contact with the vessel, with no possibility of recovery in case of accident or illness and without any specific professional title. We have the help of a crew whose members don't have any professional qualifications to provide adequate assistance in case of need. In short our work is at the limit of human possibilities .

Gap and regulatory implications in terms of security

During this decade of activity, tens of fishermen have died in the Mediterranean.
Some others risked their lives and very often were injured.

Meanwhile, the final decree of the Sardinia Government states that : *"The current regulations do not provide for the recognition of a special license that qualifies operators to carry out the business of red coral fishing that is a difficult and complex activity carried out at great depths (over 80 m) which submits the operators to considerable risks".*

The new European Safety Rules impose to all professional workers and also to the professional divers who operate over 50 m depth, the use of hyperbaric plants in closed bell, cables and umbilical cords. A constant audio-visual monitoring and medical assistance as well as adequate naval support means are also required (see the 89/391/CEE Directive of June 12, 1989; the article 153 on the Functioning of the European Union with in particular the "principle of prevention and risk assessment at work", and the references concerning the safety rules in professional diving in sites as: HSE.gov.uk; imca-int.com and edtc.org, whose aims are to make European professional diving safer).
The coral harvesting is to be considered, without any doubt, a diving professional activity, and as such it has to ensure compliance with all Safety Regulations, to all workers with equal rights. Due to the elevated costs these international Safety Rules are applied on industrial scale, but not on artisan scale.
Therefore such legislation cannot protect fishermen legitimized, *de facto*, to perform diving to great depths with outdated technique completely outside the UNI 11366 provision.

Thus there is a serious legislation lack that doesn't defend the safety and lives of the coral fishermen who execute deep water diving with an obsolete technique, out of any rules (see UNI 11366, the only Italian standard which defines and establishes the technical parameters of accident prevention for operators and hyperbaric technical divers).
We believe that the GFCM should definitely take decisions on these aspects of safety in the light of modern red coral fishing opportunities.

Practical solutions for a safe and responsible fishing

A code of conduct for a responsible fishing must take into account these issues, already underlined at important international lectures of the GFCM (Ajaccio 2011 and Alghero 2010). During those Meetings , we displayed the extreme difficulties of our work and gave a scientific contribution to prove the validity of ROV for a conservative red coral harvesting (Nutarelli *et al*, 2011).
In the General Conclusions of those Meetings it was recognized that the ROV is a effective tool for research surveys on red coral populations but was also demonstrated that, thanks to this vehicle, the red coral can be harvested safer for the environment. During those Meetings it was also highlighted that the coral divers are forced to work under extremely hard conditions while the ROV fishing would provide great advantages in term of security.

Consequently, the GFCM recommended the Member States to start appropriate experimental campaigns in different sites and areas of the Mediterranean, with the direct involvement of the operators, in order to test and evaluate the proper functioning of the ROV for harvesting in good conditions of profitability, safety for the fisherman and sustainable for the environment. Those recommendations were already parts of the conclusions of the Workshop of 2010 (Alghero) and reiterated in the GFCM 35/2011/2.

Together with these recommendations, a research project on the impact of ROV for the coral fishing was twice presented to the Sardinia Government by the University of Sassari (July 2011 and May 2012), the same presented at the GFCM of Ajaccio.
The Sardinia Government, which regulates fishing annually by special decree, has not implemented the program of experimental fishing yet. Besides it has no provided any answer on questions raised by some fishermen concerning safety. This despite the obligation made by the Deliberation N. 3/33 of January 26, 2009 and the adequate scientific support.

It's our opinion that some members of the scientific world and Administrations continue to confuse some ROV, that are little more than toys, with others equipped with everything you need to make a conservative fishery virtually harmless to the coral populations and to environment.
As a consequence, statements of this kind were published:

1) If you use the ROV there are no more restrictions on fishing!
Forgetting that the legislation applied to divers could be also applied to ROV fishing.
2) Scuba harvesting inflicts little direct damage to non-target species in the same habitat (see Cau *et al*, 2013 - GFCM:XXXVII/2013/Inf.17).
Anyone who has seen a video of a coral diver at work, realizes that during the collection there is a big impact on coralligen:

We refer to ROV that:
1) has a weight not less than 80 kg.
2) is equipped with a stabilization system that leaves it absolutely still near the rock to ensure the correct position of the gear during the coral harvesting. The visual equipment must be adequate for the operations.
3) can catch coral branches only one by one
4) can't fish into small caves, overhangs, crevices or holes.

Today the use of this technology is imposed to the attention of the Scientists and Authorities with the utmost urgency in view of the complex situation briefly exposed. The Regional Government in Sardinia, continues to legitimize an activity carried out outside all logic or common sense in complete disregard of the health and safety of the workers. They simply state that the use of ROV for fishing is forbidden by GFCM.

The reserve of some members of the scientific world towards the ROV technology applied to the red coral harvesting is difficult to understand. In fact its use is accepted for collecting deep coral in the Pacific Ocean but it is forbidden in the Mediterranean. So questions are:
1) Is deep environment less damaged by ROV than the shallow one? Or also: 2) Is the damage of the Pacific environment a less serious matter? Finally: 3) Could a specie that has endured for hundred years to destructive fishing practices (eg. the use of "ingegno") be destroyed by the ROV harvesting?
In spite of this, the scientific world agrees that the red coral is not an endangered species.

Surprisingly, little talk is devoted to denounce the serious environmental pollution that affects the coralligenous reefs, with so many nets and fishing gear lost and /or abandoned.

For example, the spiny-lobster fishery is made by hundreds of boats, equipped with km of nets, deployed and set daily, that tear everything from the bottom, e.g. gorgonians, bryozoa, porifera and also the coral is caught accidentally. This is the reason why the of spiny-lobster fishermen know, best of any one, the coral shoals.
These facts were documented and denounced several times in various Institutional Forum by fishermen.

Only through an appropriate selective collection, focused exclusively to the larger ramifications and monitoring areas with young colonies (a method that can only be guaranteed with the use of Rov) a truly sustainable fisheries with respect of the environment and the red coral itself can be done.

We also can't miss the opportunity to start a work that is extremely technical, done by very experienced people. It can be further developed and greatly improved with the aid of new technologies, in full respect of the environment and the sustainability of the resources.

We expect a solution to these problems by this Authoritative Commission. We must not lose this opportunity because the year 2015 is approaching.

Attachments: *A letter sent by SIMSI to some Italian Ministry is enclosed*