



Original Article

## Marine Species Identification by Underwater Photography

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Received 8 February 2014; received and revised form 2 March 2014; accepted 21 May 2014  
Available online 30 June 2014

### Abstract

Underwater photography is important for most underwater experiments. One way to take such pictures is by scuba diving. In this study 197 underwater photographs were taken by 21 dives in 6 Black Sea dive sites. Maximum depths of the dives were between 4 and 18.5 meters. A Nikon Coolpix S510 camera was used for underwater photography, with Fantasea FS 500 waterproof housing and no strobe. After studying a total of 175 properly taken photographs, 20 species of Kingdom Animalia were identified. In conclusion, underwater photography is a useful tool for marine species identification and may complement scuba diving visual census.

*Keywords:* photography, underwater, marine species, identification, scuba diving.

### 1. Introduction

The need for scientists to observe and acquire, as divers, underwater data is recognized in all fields of marine science [14]. Most subsea experiments depend on photographic documentation [4], underwater imaging being widely used in scientific research and technology [12]. But underwater photography looks back on a long history. Most sources credit English photographer William Thompson with taking the first underwater photograph, in 1856 [2, 10]. Other sources credit a constructing engineer named Louis Boutan with first underwater photograph, in 1893 [15].

Underwater photography progressed rapidly in the twentieth century: a major milestone was, in 1957, the invention of the first waterproof 35 mm camera that could be used both above and under water [13]; in the early 60's Plexiglas housing was used for the first time to allow a wider range of cameras to be functional underwater [13].

Transition from film to digital has been also a revolution, because digital cameras contain sensors that detect and record information like tonal range and highlight capture [10].

Underwater photography is useful for many purposes: to detect cryptobenthic species [5]; to observe fish habitat [7]; to obtain information on the biology of sponges [3]; to describe coral reef habitats [6]; to quantify abundance of marine organisms [8, 11]. Underwater photography is also a useful method for taxonomic and ecologic studies [9]. The aim of this study was to identify marine species from Black Sea coast by underwater photography, using SCUBA technique.

### 2. Material and Method

21 dives were made in 2012 and 2013, in 6 dive sites: 3 from Romania (Constan a South-Agigea harbour and Mangalia) and 3 from Bulgaria (between Shabla lighthouse and Tyulenovo), at maximum depths between 4 and 18.5 meters. Depths were recorded using a dive computer. A Nikon Coolpix S510 camera was used for underwater photography, with Fantasea FS 500 waterproof housing and no

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strobe (fig. 1). 197 photos were made, but just 175 were good enough for our purpose.

No computer program was used for modifying photos, which were analyzed as original.



Figure 1. Underwater photography

### 3. Results and Discussions

After photo analyzing [17, 18, 19, 20, 21], 20 species from the Animal Kingdom (Regnum Animale) were identified (table 1). Scuba diving

underwater photography is influenced by divers training, scuba gear, diving depth, water clarity and quality of the underwater camera.

Table 1. Species identified by underwater photography

Species	Name	Family
<i>Dysidea fragilis</i>	Goosebump sponge	Dysideidae
<i>Aurelia aurita</i>	Moon jellyfish (photo 2)	Ulmaridae
<i>Rhizostoma pulmo</i>	Barrel jellyfish (photo 3)	Rhizostomatidae
<i>Mytilus galloprovincialis</i>	Mediterranean mussel	Mytilidae
<i>Rocellaria dubia</i>	Flask-shell	Gastrochaenidae
<i>Rapana venosa</i>	Veined whelk	Muricidae
<i>Carcinus aestuarii</i>	Mediterranean crab	Portunidae
<i>Liocarcinus holsatus</i>	Swimming crab	Portunidae
<i>Xantho poressa</i>	Stone crab	Portunidae
<i>Sardina pilchardus</i>	Pilchard (european sardine)	Clupeidae
<i>Engraulis encrasicolus</i>	European anchovy	Engrulidae
<i>Anguilla anguilla</i>	European eel	Anguillidae
<i>Syngnathus typhle</i>	Deep-nosed pipefish (photo 4)	Syngnathidae
<i>Nerophis ophidion</i>	Straight-nosed pipefish	Syngnathidae
<i>Hippocampus guttulatus</i>	Long-snouted seahorse (photo 5)	Syngnathidae
<i>Gaidropsarus mediterraneus</i>	Shore rockling	Lotidae
<i>Uranoscopus scaber</i>	Stargazer	Uranoscopidae
<i>Scorpaena porcus</i>	Black scorpionfish	Scorpaenidae
<i>Psetta maeotica</i>	Black Sea turbot	Scophthalmidae
<i>Solea solea</i>	Dover sole	Soleidae



**Figure 2.** Moon jellyfish (*Aurelia aurita*)



**Figure 3.** Barrel jellyfish (*Rhizostoma pulmo*)



**Figure 4.** Deep-nosed pipefish (*Syngnathus typhle*)



**Figure 5.** Long-snouted seahorse (*Hippocampus guttulatus*)

Good results in species detection can be obtained with a small number of photographs [5]. Even if most underwater images are post-processed

to look pleasing to human viewers [1], raw photos can be used for species identification.

In this research area, a field work was carried

out in 2007-2008 (by scuba diving visual census and underwater photography) for identification and documentation of marine habitats and species with high importance for conservation and mapping of their distribution [16]. The goals of that project were to do a list of priority regions for Marine Protected Areas (MPAs) designation and the development of ecologically coherent network of MPAs in Bulgaria and Romania.

#### 4. Conclusions

Underwater photography by scuba diving is a useful tool for marine species identification. This technique may complement scuba diving visual census.

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