

## A review on published reports of the HVAR Expedition

Ivan JARDAS and Nada KRSTULOVIĆ

*Institute of Oceanography and Fisheries, P.O. Box 500, 21000 Split, Croatia*

---

*The results of Fishery-biological HVAR Expedition were published in the special periodical publication "Izvešća – Reports", the M.V. "Hvar" cruises-researches into fishery biology 1948-1949 based on the earlier accepted scheme, as well as in other local and foreign publications. From 44 initially planned reports, only 17 reports were published in the period between 1951 (first report) and 1979 (last report). Approximately 100 reports based on the data of HVAR Expedition, were published, partly or entirely, in other publications. One part of the material collected is not scientifically elaborated nor published.*

---

**Key words:** HVAR Expedition, publications

The Fishery-biological Expedition by the vessel HVAR (1948-1949) was one of the greatest organisational and scientific-research attempts of the Institute of Oceanography and Fisheries in Split, in the period after the Second World War. At the same time, that was the only attempt of that kind in the history of the oceanographic research of Adriatic, especially concerning the great range of problems included. Therefore, the main tasks of the Expedition were the following: general introduction of quantitative and qualitative structure, horizontal and bathymetrical distribution and according to possibilities, seasonal dynamics of demersal fish and edible invertebrate (Crustacea, Cephalopoda) populations in the open Adriatic waters. Some other inherently important researches were also included in the programme of the Expedition that was essential in researching a solution of main targeted tasks. Thus, in its programme the Expedition had a monitoring of state and fluctuations of the basic environmental factors, both abiotic (depth, structure of bottom sediments, temperature, salinity, transparency, contents of nutrient salts, etc.) and biotic (quan-

titative and qualitative structure of zoobenthic communities, phytoplankton and zooplankton as elements of organic production, and ichthyoplankton as a part of zooplankton). One of the Expedition tasks was also the introduction with the possibilities of fishing exploitation and application of more efficient and rational fishing techniques, as well as investigations of biology and ecology of important demersal fish and edible invertebrate species. Moreover, special additional researches were obtained concerning the algal vegetation on the fishing grounds, as well as horizontal and vertical distribution of bacterioplankton in relation to basic hydrographic factors (ŠOLJAN, 1977). All those researches were performed in order to attend a solid background for similar intensive researches in the future, which became true considering directions of later complex researches of the Adriatic Sea by the Institute of Oceanography and Fisheries in Split, as well as the number of published reports in local and foreign publications in which the results of the Expedition were used.

---

The HVAR Expedition was performed in the period between February 26 1948 and March 31 1949, which is thirteen months in total, including 176 stations situated predominantly in the open Adriatic waters. Only five stations, i.e. trawlers, were located in the channel and bay areas for the purpose of comparison of realised catches on these stations with the catches realised on trawler's stations in the open sea. The stations were situated in the territorial waters of former Yugoslavia and Albania from the western Istrian coast (connecting the Rovinj-Venice line) to Himara in Albania, as well as in the international waters (in the middle and southern Adriatic up to approximately 20 nautical miles off the Italian coast).

The detailed survey of expedition concerning the aim, as well as the programme, organisation and field realisation can be found, together with the earlier quoted ŠOLJAN's report (1977), also in reports of ŠOLJAN (1955, 1956), KARLOVAC, O. (1968) and RATKOVIĆ (1988).

The original plan of material elaboration of the HVAR Expedition, as well as the published results of the Expedition one-year research, mainly in the open sea, was established after the end of its cruising, but only in general and not under obligation. Thus, certain specialists elaborate particular thematic components in the Institute of Oceanography and Fisheries in Split, as well as in former Yugoslavia and in other foreign countries (T. ŠOLJAN, MS). The special periodical publication of the Institute – "Izvješća – Reports" Ribarstveno-biološke ekspedicije m/b "Hvar" 1948-1949 (The M.V. "Hvar" cruises-researches into fisheries biology 1948-1949) was established for publishing results of the expedition, after the pattern of many previous expeditions. According to the original scheme (ŠOLJAN, MS) all achieved results of the Expedition were supposed to be published in six volumes of the periodical publication where each one contained several numbers divided according to close problematic (for instance Vol.1, No.2 on "subnumbers" 2A, 2B, 2C, etc.) (Table 1), and were conceived to be chronologically based on arrivals of the reports. It was also planned that 23 authors (20 local and

3 foreign) scientifically elaborate and publish, in previous mentioned publication, the largest part of biological material collected, i.e. physical and chemical properties, data regarding the sea and sea bottom, as well as, data concerning other various observations during the Expedition field work, but only 11 authors completed their obligation. The elaboration of one part of biological material collected remained open. These were the data of the particular groups of phytoplankton and zoobenthos, and some of ichthyoplankton and ichthyobenthos themes. One part of that material was elaborated and published later in various local and foreign publications, when all conditions were fulfilled, including the scientific-staff conditions. Thus, the data of ecology of hake, *Merluccius merluccius* (L.) (KARLOVAC, O., 1959; KARLOVAC, J., 1965; MUŽINIĆ and KARLOVAC, O., 1975), the amount of macrozooplankton (VUČETIĆ, 1963), Mysidacea (HOENIGMAN, 1963), biology of smallspotted catshark, *Scyliorhinus canicula* (L.) (ČANADJIJA, 1964; JARDAS, 1979), pelagic Diatoms (PUCHER-PETKOVIĆ, 1966), extension of early and full-grown stages of bogue, *Boops boops* (L.) (KARLOVAC, J. and KARLOVAC, O., 1974), flatfishes of the genus *Lepidorhombus* (KARLOVAC, O., 1975), Squalidae family (KARLOVAC, O., 1976) and other data were elaborated and later published, mostly summarised. The original plan realisation of publishing the results of Expedition had to go through some changes dictated by an existing situation. A certain scientists who were expected to deal with a scientific elaboration of material collected, unfortunately died, while some of them left the Institute in order to perform other duties outside of Split that enabled them to continue with a commenced work. The first report was published in 1951 in Vol. 3, No. 1 – about mechanical structure of bottom sediments in the open Adriatic (MOROVIĆ, D.). Until 1960, thirteen reports of various problems were published, and after that fore more reports were published. The latest report was published in 1979 in Vol. 4, No. 2-3 – about morphology, biology and ecology of smallspotted catshark, *Scyliorhinus canicula* (L.), (JARDAS, I), which

Table 1. Original plan of publishing the results of the Fishery-biological Expedition HVAR (1948-1949) (ŠOLJAN, MS)

Contents	Experts supposed for elaboration
<b>Vol. I. - INTRODUCTION AND GENERAL PART</b> No. 1. - <i>Purpose and tasks of the expedition</i> No. 2. - <i>Metodology</i> A. - Ship and cruises B. - Fishing gear and its application C. - Apparatus and technic of scientific work No. 3. - <i>Station list</i>	ŠOLJAN, T., Split  PRIMORAC, K., Split RUIĆ, L., Split ŠOLJAN, T., Split KARLOVAC, O., K. PRIMORAC, and G. GOSPODNETIĆ, Split
<b>Vol. II. - HIDROLOGY</b> No. 1. - <i>Hydrological data of the Adriatic Sea</i> A. - HVAR Expedition B. - Other cruises 1946-1950 No. 2. - <i>Water salinity fluctuations in the Adriatic Sea</i>	BULJAN, M. and M. MARINKOVIĆ, Split BULJAN, M., Split
<b>Vol. III. - SEA BOTTOM</b> No. 1. - <i>Mechanical structure of sediments</i> No. 2. - <i>Mineral structure of sediments</i> No. 3. - <i>Bottom tanatocoenoses (with quantitative relationships of the bottom fauna)</i> No. 4. - <i>Depths and entanglements of nets</i>	MOROVIĆ, D., Split VULETIĆ, A., Split  VIDOVIĆ, A., Split PRIMORAC, K., G. GOSPODNETIĆ, and F. GRUBIŠIĆ, Split
<b>Vol. IV. - PLANKTON</b> No. 1. - <i>Phytoplankton</i> A. - Bacteria distribution in the Middle Adriatic Sea B. - Peridineae C. - Diatomeae D. - Silicoflagellata E. - etc. No. 2. - <i>Zooplankton</i> A. - Generally B. - Specially a) Anthozoa larvae b) Hydromedusae c) Desmomyaria (Tunicata) d) Different Crustacea groups e) Other zooplankton No. 3. - <i>Ichthyoplankton</i> A. - Fish larvae from the spring period 1948/49 B. - Fish larvae from the summer, autumn and winter period 1948/49 C. - <i>Sardina (Sardina pilchardus WALB.)</i> larvae D. - <i>Sardina (Sardina pilchardus WALB.)</i> eggs E. - Eggs of different fish species	CVIČIĆ, V., Split ? ? ? ?  HOENIGMAN, J., Split  PAX, F., Bremenhaven and I. MÜLLER., Bremen BABNIK, P., Ljubljana HOENIGMAN, J., Split HOENIGMAN, J., Split VUČETIĆ, T., Split  KARLOVAC, J., Split  KARLOVAC, J., Split KARLOVAC, J., Split GAMULIN, T., Dubrovnik ?
<b>Vol. V. - NEKTON AND EDIBLE ZOOBENTHOS</b> No. 1. - <i>Benthos fish and edible invertebrate communities - associate elaboration</i> A. - Ecological part B. - Fisheries part No. 2. - <i>Special elaboration</i> A. - <i>Merluccius merluccius (L.)</i> B. - Sternoptichidae, Stomiidae and Scopelidae C. - <i>Nephrops norvegicus L.</i> D. - <i>Mullus barbatus L.</i> E. - <i>Raja clavata L.</i> F. - Other fish species	KARLOVAC, O. and T. ŠOLJAN, Split  KARLOVAC, O. and T. ŠOLJAN, Split KARLOVAC, O. and T. ŠOLJAN, Split  KARLOVAC, O., Split KARLOVAC, J., Split KARLOVAC, O., Split KARLOVAC, O., Split ČANADJIIA, S., Zagreb ?
<b>Vol. VI. - OTHER BENTHOS</b> No. 1. - <i>Antipatharia, Zoantharia and Actinaria</i> No. 2. - <i>Alcyonaria, Gorgonaria, Pennatularia and Madreporaria</i> No. 3. - <i>Cirripedia</i> No. 4. - <i>Hydroidea</i> No. 5. - <i>Crustacea Decapoda</i> No. 6. - <i>Echinodermata</i> No. 7. - <i>Other zoobenthos groups</i> No. 8. - <i>Algae vegetation on the fishing ground of Adriatic Sea</i>	PAX, F., Bremenhaven  BROCH, H., Oslo BROCH, H., Oslo HADŽI, J., Ljubljana KARLOVAC, O., Split VIDOVIĆ, A., Split ? ERCEGOVIĆ, A., Split

Table 2. Printed reports in the periodical publications "Izvješća - Reports" of the Fishery-biological Expedition HVAR (1948 - 1949)

Contents	Author and year
<b>Vol. I. – INTRODUCTORY PART</b> No. 1-2. – The M.V. "Hvar" cruises - researches into fisheries biology in the open Adriatic (1948 - 1949) (in croatian) No. 3. – Station list of the M.V. fishery-biological cruises 1948 - 1949	ŠOLJAN, T., 1977 KARLOVAC, O., 1956
<b>Vol. II. – HIDROLOGY</b> No. 2. – Fluctuations of salinity in the Adriatic	BULJAN, M., 1953
<b>Vol. III. – SEA BOTTOM</b> No. 1. – Composition mécanique des sédiments au large de l'Adriatique	MOROVIĆ, D., 1951
<b>Vol. IV. – PLANKTON</b> No. 1. – Distribution of bacteria in the waters of the Mid Adriatic Sea No. 2-3. – Morphological, biological and ecological characteristics of the smallspotted dogfish, <i>Scyliorhinus canicula</i> (L.), population in the Adriatic Sea No. 4 A. – Analyse du contenu du tractus digestif du stade planctonique de maquereau ( <i>Scomber scombrus</i> L.) en Adriatique (in croatian) No. 4 C. – La ponte et les aires de ponte de la sardine ( <i>Sardina pilchardus</i> WALB.) dans l'Adriatique de 1947 à 1950 (in croatian) No. 4 D. – Investigations on the larvae and postlarvae of the sardine ( <i>Sardina pilchardus</i> WALB.) in the open waters of the Adriatic Sea	CVIIĆ, V., 1955 JARDAS, I., 1979 KARLOVAC, J., 1962 GAMULIN, T., 1954 KARLOVAC, J., 1958
<b>Vol. V. – NEKTON AND EDIBLE ZOOBENTHOS</b> No. 1. – Exploration of fish and edible invertebrata carried out by trawling in the open Adriatic (in croatian) No. 2 A. – Contribution à la connaissance de l'écologie de <i>Trachurus trachurus</i> L.) au large de l'Adriatique No. 2 B. – Sternoptychidae, Stomiidae and Scopelidae in the Adriatic Sea No. 2 C. – An ecological study of <i>Nephrops norvegicus</i> (L.) of the high Adriatic	KARLOVAC, O., 1959 KARLOVAC, J. and O. KARLOVAC, 1971 KARLOVAC, J., 1953 KARLOVAC, O., 1953
<b>Vol. VI. – OTHE BENTHOS</b> No. 1. – Die Antipatharien, Zoantharien und Actinarien der HVAR Expedition No. 2. – Octocorals and stony corals of the high Adriatic trawling grounds No. 3. – Cirripedia of the high Adriatic trawling grounds No. 4. – La végétation des algues sur les fonds pêchereaux de l'Adriatique	PAX, F., 1952 BROCH, H., 1953 BROCH, H., 1953 ERCEGOVIĆ, A., 1960

was only partially based on the data of the Expedition (Table 2). The periodical publication "Izvješća – Reports" was concluded by this paper, although from approximately 44 initially planned scientific papers, only 17 papers were published. Therefore, the Expedition HVAR, similar to some previous expeditions held in the Adriatic, Mediterranean and Red Sea, and which results weren't published entirely, e.g. Austrian Expedition by the ship POLA (1890-

92, 1895, 1897) in the Mediterranean and Red Sea, as well as Austro-Hungarian-Italian Expedition by the ships NAIADE and CICLOPE (1911-1914) in the Adriatic Sea (STEUER, 1913), also ingloriously finished.

The results of HVAR Expedition were used, and at the same time published, not only in the periodical publication "Izvješća – Reports", but also in other local and foreign publications, mostly in reports, more or less based on the pub-

lished data of expedition (mechanical structure of bottom sediments in the open Adriatic (MOROVIĆ, 1951), or based on the gathered and elaborated scientific data published in the periodical publication (Vol.1, No. 3 – “Station list”, KARLOVAC, O., 1956; Vol.5, No. 1 – “Exploration of fish stocks and edible invertebrates”, KARLOVAC, O., 1959), as well as based on original, so far unpublished data of the expedition. Therefore, according to preliminary estimates, approximately 100 scientific reports were published mostly in other publications of the Institute (“Acta Adriatica”, “Bilješke-Notes” Inst. oceanogr. i rib., Split, “Fauna et flora adriatica”- approximately 28), in the publications “Morsko ribarstvo”- approximately 13, “Pomorski zbornik”- approximately 12, as well as in the publications of C.I.E.S.M. (Comm. Int. Explor. Sci. Mer Médit., Rapp. P.-v. Réunion-approximately 11), FAO (Proc. Gen. Fish. Coun. Medit.- approximately 10) and in some other publications about 27.

The material collected as well as reports based on the expedition were a solid background for several doctor degree thesis on vari-

ous problems made at the Institute of Oceanography and Fisheries in Split: KARLOVAC, O., 1953 – ecological study of Norway lobster, *Nephrops norvegicus* (L.); PUCHER-PETKOVIĆ, 1966 – vegetation of pelagic Diatoms; KARLOVAC, J., 1967- ecology of sardine, *Sardina pilchardus* (WALB.), during the planktonic phase of life; JARDAS, 1979 – morphology, biology and ecology of smallspotted catshark, *Scyliorhinus canicula* (L.); ŠIMUNOVIĆ, 1995 – ecology of Gastropoda Prosobranchiata; ALFIREVIĆ, 1998 – taxonomy, distribution and ecology of Foraminifera.

#### ACKNOWLEDGEMENTS

We are pleased to thank Dr. Radosna MUŽINIĆ, Dr. Tereza PUCHER-PETKOVIĆ, Dr. Tamara VUČETIĆ and Dr. Šime ŽUPANOVIĆ, who helped us with their reports, which contained the data of the HVAR Expedition, as well as Dr. Jožica KARLOVAC for the data gathered and ceded of the HVAR Expedition.

#### REFERENCES

*Remark:* The reports quoted in the text and cited in the tables are not listed in References.

- ALFIREVIĆ, S. 1998. The taxonomy, distribution and ecology of Adriatic Foraminifera. *Acta Adriat.*, 39 (2): 11-251.
- ČANADJIJA, S. 1964. Prilozi poznavanju biologije mačke bljedice (*Scillium canicula* Cuv.). *Acta Adriat.*, 11 (7): 65-70.
- HOENIGMAN, J. 1963. Mysidacea de l'expédition HVAR (1948-1949) dans l'Adriatique. *Rapp. P.-v. Réunion, CIESMM*, 17 (2): 603-61.
- KARLOVAC, J. 1965. Contribution à la connaissance de l'écologie du merlu, *Merluccius merluccius* L., dans le stade planctonique de sa vie en Adriatique. *Rapp. P.-v. Réunion, CIESMM*, 18 (2): 461-464.
- KARLOVAC, J. 1967. Etude de l'écologie de la sardine, *Sardina pilchardus* WALB., dans la phase planctonique de sa vie en Adriatique moyenne. *Acta Adriat.*, 13 (2), 109.
- KARLOVAC, J. and O. Karlovac. 1974. Rasprostranjenost ranih i odraslih stadija bukve, *Boops boops* (L.), u otvorenom Jadranu. *Pomorski zbornik DPUPJ*, 12: 411-422.
- KARLOVAC, O. 1959. La nourriture du merlu (*Merluccius merluccius* L.) de la haute Adriatique. *FAO Proc. gen. Fish. Coun. Medit.*, 5: 333-339.
- KARLOVAC, O. 1968. O dvadesetogodišnjici ekspedicije HVAR. *Pomorski zbornik DPUPJ*, 6: 877-890.
- KARLOVAC, O. 1975. Plosnatice roda *Lepidorhombus* (Pisces) u Jadranu. *Pomorski zbornik DPUPJ*, 13: 501-510.
- KARLOVAC, O. 1976. Jadranski morski psi iz porodice Squalidae. *Pomorski zbornik DPUPJ*, 14: 595-610.

- MUŽINIĆ, R. and O. KARLOVAC. 1975. On food preferences of the Adriatic hake, *Merluccius merluccius* (L.). Acta Adriat., 17 (7), 48 pp.
- PUCHER-PETKOVIĆ, T. 1966. Végétation des diatomées pélagiques de l'Adriatique moyenne. Acta Adriat., 13 (1), 97 pp.
- RATKOVIĆ, D. 1988. Četrdesetogodišnjica ribarstveno-biološke ekspedicije m/b HVAR u otvorenom Jadranu. Morsko ribarstvo, 3: 91-92.
- STEUER, A. 1913. Ziele und Wege biologischer Mittelmeerforschung. Verl. Gesell. Deutsch. Naturfar. u. Arte, Leipzig, 1: 1-30.
- ŠIMUNOVIĆ, A. 1995. Ecological study of Prosobranchiata (Gastropoda) in the eastern part of the Adriatic Sea and their relationship to benthic biocoenoses. Acta Adriat., 36 (1/2): 3-162.
- ŠOLJAN, T. 1955. Ribarstveno-biološka ekspedicija m/b HVAR. Zbornik I. Kongr. biol. Jugosl. (Zagreb, 1953), ref. 134: 343-344.
- ŠOLJAN, T. 1956. Ribarstveno-biološka ekspedicija m/b HVAR. Morsko ribarstvo, 7: 201-205.
- VUČETIĆ, T. 1963. Sur la quantité de macrozooplancton du large de l' Adriatique (Expédition HVAR 1948-49). Rapp P.-v. Réun., CIESMM, 7 (2): 531-521.

Accepted: 25 August 1999

## Osvrt na publicirane radove ekspedicije Hvar

Ivan JARDAS i Nada KRSTULOVIĆ

*Institut za oceanografiju i ribarstvo, P.P. 500, 21000 Split, Hrvatska*

### SAŽETAK

Po završetku krstarenja Ribarstveno-biološke ekspedicije HVAR (1948.-1949.) u otvorenom Jadranu rezultati su objavljeni u specijalnoj periodici "Izvešća-Reports" Ribarstveno-biološke ekspedicije m/b "Hvar" 1948-1949 (The M.V. "Hvar" cruises -researches into fisheries biology 1948-1949 ) po ranije prihvaćenoj shemi, te u drugim publikacijama u zemlji i inozemstvu. U razdoblju od 1951. (prvo izvješće) do 1979. (zadnje izvješće) od predviđena 44 izvješća objavljeno je u periodici 17. U drugim publikacijama objavljeno je oko 100 izvješća koja su se djelomično ili u potpunosti temeljila na podacima ekspedicije HVAR. Dio sakupljenog materijala ekspedicije nije znanstveno obrađen niti publiciran.