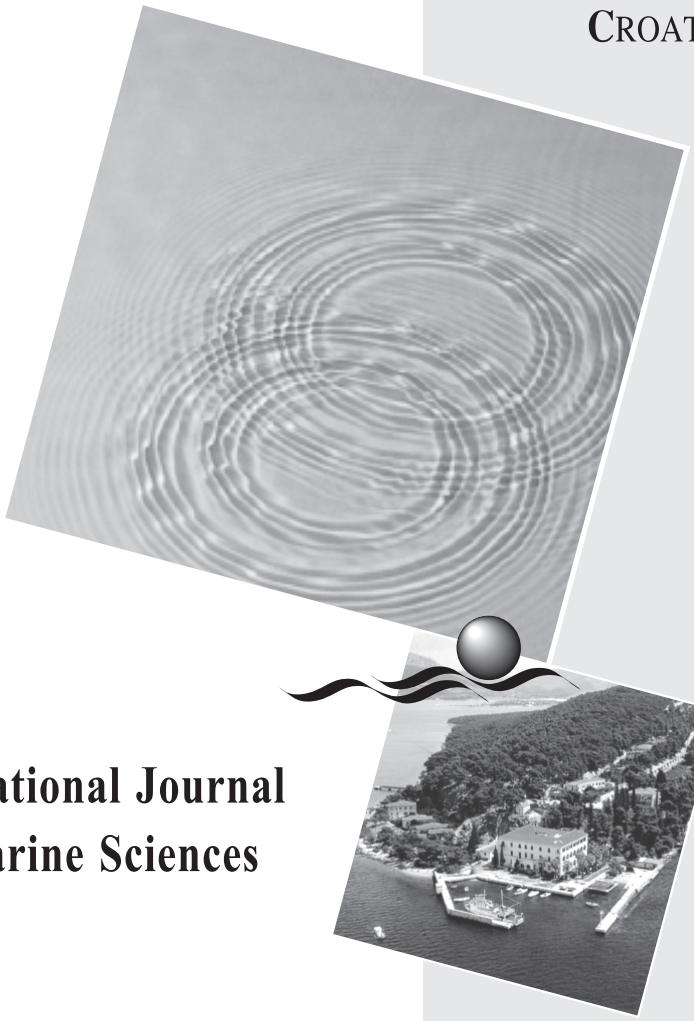
Acta Adriatica

Acta Adriatica

Available online at
www.izor.hr/acta/eng
ESSN:1846-0453

INSTITUTE
OF
OCEANOGRAPHY
AND
FISHERIES
SPLIT
CROATIA



International Journal of Marine Sciences

ISSN: 0001-5113
AADRAY 60 (2) 107-210 A1-A2 2019
UDC 551.46+58+59 (262)

PUBLICATION INFORMATION

ACTA ADRIATICA IS PEER REVIEWED JOURNAL

IF for 2017 = 0.725
IF for 2018 = 0.714

The Acta Adriatica is an international journal which publishes the papers on all aspects of marine sciences, preferably from the Mediterranean. Minimum of two international referees review each manuscript. Editorial Board members advice the Editors on the selection of supplementary referees. Acta Adriatica is published continuously since 1932.

Acta Adriatica is cited in the folowing data bases:

- Agricola
- Aquatic Science & Fisheries Abstracts
- CAB Abstracts
- CNRS-INIST
- Dialog
- DOAJ
- EBSCOhost
- Fish & Fisheries Worldwide by NISC, South Africa
- Georeference
- HRČAK
- ISI Web of Knowledge
- Oceanic Abstracts
- Pollution Abstracts
- Proquest
- Referativnij Zhurnal
- SCI Expanded
- Scopus
- Water Resources Abstracts
- WoS-Web of Science
- Zoological Record

Until the end of 2019 there were 60 volumes published with total of 1006 scientific papers.
Types of papers that can be submitted for consideration by the Editorial Board are:
a) original scientific papers, b) review articles, c) short communications, d) conference papers,
within the board field of marine and fishery science, referring preferably to the area of the Mediterranean or dealing with other areas, providing they relate to the Mediterranean in some aspect.

ORIGINAL SCIENTIFIC PAPERS:
Should report only original results. They are limited to 20 printed pages (80,000 characters). The publication of larger articles is subjected to the Editor's agreement.

REVIEW ARTICLES:
They should be invited or agreed by the Editor. They should be concise (up to 25 printed pages, i.e., 100,000 characters), critical and creative. They should seek to stimulate topical debate and new research initiatives. Prospective authors are asked to send an extended abstract (two pages maximum) of their paper to the Editor by e-mail. The abstract should outline why the review is topical, its main points and objectives, and how it will stimulate debate and research. When the proposal has been accepted by the Reviews Editor, he will invite the author to submit a manuscript within an agreed time limit and following the general guidelines for submission of standard papers.

SHORT COMMUNICATIONS:
Short communications, which do not occupy more than four printed pages (16,000 characters). A Short Communication may be concerned with any subject within the scope of the Acta Adriatica but should be confined to a single point or issue of progress, such as an unusual occurrence, an interesting observation, or a topical and timely finding. The manuscript must, however, have some relevance beyond the species or locality under consideration.

CONFERENCE PAPERS:
Conference papers should report only original results which were presented on the conferences and symposiums. They should be submitted as like as original research papers.

Acceptance of papers. Papers will normally be critically reviewed by two or more outside experts in the relevant discipline and evaluated for publication by the Editor; however, the Editor may return to authors without review any manuscripts deemed to be of inadequate quality or inappropriate for the Acta Adriatica.

ISSN: 0001-5113
AADRAY

ACTA ADRIAT.,
60(2): 109 - 113, 2019

EDITORIAL NOTE

IN MEMORIAM

This volume is dedicated to our colleague Dr. SLOBODAN REGNER who was devoted to fisheries biology, ecology of developmental stages of fishes, pelagic and demersal fish stock assessments, and long - term fluctuations of pelagic fish populations.

Dr. SLOBODAN REGNER
1944-2019

In Belgrade, on August 8, 2019, at the age of 75, Dr. Slobodan Regner, a scientific adviser to the Institute of Marine Biology-University of Montenegro, passed away. The departure of our colleague who was the founder of modern marine fisheries biology in Croatia and Montenegro, represents a major loss for the Croatian and Montenegrin academic and scientific community. We are sincerely deprived of a man who knew a great deal about the sea, who devoted his entire life to the sea and the discovery of its secrets, and who shared his knowledge selflessly and with ease to his students.

Dr. Slobodan Regner was born on November 4, 1944 in El - Shatt, Egypt. He was educated at the University of Belgrade, Faculty of Natural Sciences (B. Sc. in Biology, 1967), at the University of Zagreb, Faculty of Natural Sciences (M. Sc. in ecology, 1970), and at the University of Belgrade, Faculty of Natural Sciences (Ph. D. in Biology, 1980).

He worked in the Institute of Oceanography and Fisheries, Split (1968 - 1991), in Natural History Museum, Belgrade (Serbia) (1991 - 1994), and from 1994 until his retirement in the Institute of Marine Biology, Kotor (Montenegro).

His investigations cover problems mainly in marine biology, particularly those in fisheries biology, in the ecology of developmental stages of fishes, pelagic and demersal fish stock assessments, and long - term fluctuations of pelagic fish populations.

Scientific work through his master's the-

sis on "Contribution to the knowledge of the ecology of the planktonic stage of anchovy life*, Engraulis encrasicolus* (Linnaeus, 1758), in the Middle Adriatic", defended in 1970, was crowned with a doctoral dissertation entitled "Ecology of planktonic stages of anchovy, *Engraulis encrasicolus* (Linnaeus, Linnaeus, 1758)", which he defended at the Faculty of Sciences, University of Belgrade, in 1980. He spent a certain time at the Institute of Oceanography and Fisheries in Split (Croatia), studying the ecology of planktonic stages of fish, beginning with qualitative and quantitative analysis of ichthyoplankton composition in the Adriatic, research spatial-temporal distribution of eggs, larvae and postlarvae of fish in plankton in the wider Adriatic, and examination of the characteristics of development and growth of eggs, larvae and postlarvae of some species of fish under experimental conditions, analysis of the causes of fluctuations in the abundance of planktonic stages of fish, especially anchovy, to estimate anchovy biomass in the Adriatic by the method of estimating the daily production of their eggs and relative fecundity. He has also been researching the population dynamics of adult fish, primarily sardines and anchovy, mainly by analyzing long-term catch data and long-term catch forecasts based on mathematical time series approximations.

During the period 1979 - 1990, he was Croatian counterpart coordinator of the bilateral Italian - Yugoslavian project "Stock assessment of anchovy and sardine in the Adriatic by means of ichthyoplankton methods". As a coordinator of bilateral project, he cooperated with Laboratorio di Biologia Marina e di Pesca, Fano and Istituto di Zoologia e Anatomia comparata, Trieste (Italy). He coordinated the project "Population dynamics and stock assessments of pelagic and demersal resources of Montenegrin shelf area", financed by Montenegrin Ministry of Education and Science.

From 1987 to 1991, Dr. Slobodan Regner was a member of the Scientific and Teaching Council of the Postgraduate Study of Oceanology at the Faculty of Natural Science and Mathematics, University of Zagreb, and from 1985 to 1987, he was President of the Scientific Council of the Institute of Oceanography and Fisheries in Split. He was member of the International Commission for Scientific Investigation of the Mediterranean Sea. He was the president of Scientific Council of the Institute of Marine Biology in Kotor, as well as the member of Educational and Scientific Council of University of Montenegro in Podgorica.

In 1990, he received the collective award of the City of Split (Croatia) for science for his scientific contribution to the project "Management of the Kaštela Bay Area".

He was Editor–in–Chief of scientific journal "Studia Marina" issued by Institute of Marine Biology - Kotor, and the member of Editorial board of scientific journal "Acta Adriatica" and "Ichthyologia".

At the postgraduate study of Oceanology at the Faculty of Natural Sciences and Mathematics, University of Zagreb, since 1982 he has been teaching the course "Reproduction of fish and the restoration of their populations". Since 1985 he has been teaching course "Reproduction of fishes and Ecology of their early stages" as a part of the fisheries course for developing countries.

He has published more than 70 original scientific papers, and about 40 studies and reports.

Prof. Jakov Dulčić, Ph.D.
Head of Laboratory for Ichthyology and Coastal Fisheries

BIBLIOGRAPHY OF SELECTED PAPERS

1. **REGNER, S.** 1969. Preliminary observations on rockpools in the region of Rovinj. Thalassia Jugoslavica, 5:283-292.
2. **REGNER, S.** 1970. Prilog poznavanju ekologije planktonske faze života brgljuna, *Engaulis encrasicolus* (Linnaeus, 1758), u srednjem Jadranu. Magistarski rad. PMF Sveučilišta u Zagrebu: 76 p.
3. **REGNER, S.** 1971. Contribution to the knowledge of the feeding of anchovy, *Engraulis encrasicolus* (Linnaeus, 1758), postlarvae in the middle Adriatic. Ekologija, 6 (1):157-164.
4. **REGNER, S.** 1972. Contribution to the study of the ecology of the planktonic phase in the life history of the anchovy, *Engraulis encrasicolus* (Linnaeus, 1758), in the central Adriatic. Acta Adriat., 14 (9):40p.
5. **REGNER, S.** 1973. On the egg size of the anchovy, *Engraulis encrasicolus* (L.), in the central Adriatic. Ekologija, 8(1):163-168.
6. **REGNER, S.** 1974. The oscillations of the quantity of the anchovy's planktonic phase in the central Adriatic, from 1968 to 1971. Acta Adriat., 15(5): 14p.
7. **REGNER, S.** & M. GAČIĆ. 1974. The fluctuations of sardine catch along the eastern Adriatic coast and solar activity. Acta Adriat., 15(11):15p.
8. **REGNER, S.** 1976. On the early stages of fishes in the central Adriatic in 1973. Rapp. Comm. int. Mer Médit., 23(8): 63-65.
9. **REGNER, S.** 1977. On the plankton stages of gilt sardine, *Sardinella aurita* Valenciennes, in the central Adriatic. Acta Adriat., 17(3):12p.
10. **REGNER, S.** 1977. On the feeding of *Serranus hepatus* (L.) and *Cepola macrophthalma* (L.) postlarvae in the central Adriatic. Rapp. Comm. int. Mer Médit., 24(5): 87-88.
11. **REGNER, S.** & M. GAČIĆ. 1977. An attempt of long-term forecast of sardine catch along the eastern Adriatic coast. Rapp. Comm. int. Mer Médit., 24(5): 77-79.
12 **REGNER, S.** 1979. Ekologija planktonskih stadija brgljuna, *Engraulis encrasicolus* (Linnaeus, 1758), u srednjem Jadranu. Doktorska disertacija. Univerzitet u Beogradu: 188p.
13. PICCINETTI, C., **S. REGNER** & M. SPECCHI. 1979. Estimation du stock d anchois, (*Engraulis encrasicolus* L.) de la haute et moyenne Adriatique. Inv. Pesq., 43(1): 69-81.
14. PICCINETTI, C., **S. REGNER** & M. SPECCHI. 1979. Evaluation du stock de l'anchois en mer Adriatique par methodes ichthyoplanctoniques. Rapp. Comm. int. Mer Médit., 25/26(10): 211-212.
15. **REGNER, S.** 1980. On semigraphic estimation of Gompertz function and its application on fish growth. Acta Adriat., 21(1): 227-236.
16. **REGNER, S.** 1980. The larval stages of fish in the Kaštela Bay. Acta Adriat., 21(2): 123-136.
17. **REGNER, S.** 1980. On some zooplankton predators of plankton fish stages. Bilješke-Notes, 39:6p.
18. PICCINETTI, C., **S. REGNER** & M. SPECCHI. 1980. Etat du stock d'anchois et de sardine en Adriatique. FAO Fish. Rep., 239:43-52.
19. **REGNER, S.** 1981. The catching efficiency of four different plankton nets relative to ichthyoplankton objects. Bilješke-Notes, 44: 6p.
20. **REGNER, S.** 1981. Larval stages of deep-sea fishes in the channel area of the central Adriatic. Bilješke-Notes, 41: 8p.
21. **REGNER, S**., C. PICCINETTI, M. SPECCHI & G. SINOVČIĆ, 1981. Preliminary statistical analysis of sardine stock estimation from data obtained by egg surveys. FAO Fish. Rep., 253: 143-154.
22. REGNER, D. & **S. REGNER**. 1981. Diversity of some plankton taxocenoses in the central Adriatic. Rapp. Comm. int. Mer Médit., 27(7): 181-183.
23. JARDAS, I., **S. REGNER** & Š. ŽUPANOVIĆ. 1981. Some new data on the

distribution of the *Arnoglosssus rueppelli* (Cocco, 1844) in the Adriatic Sea (Pisces, Heterosomata, Bothidae). Bilješke-Notes, 43: 8p.

24. JARDAS, I., S. JUKIĆ, I. KAČIĆ, **S. REGNER** & G. SINOVČIĆ. 1981. Fisheries biology investigations in Maloston Bay and in the adjacent sea. JAZU, Savjetovanje Malostonski zaljev, privredna podloga i valorizacija. Dubrovnik, Novembar 12-14, 1981: 175-202.
25. PICCINETTI, C., **S. REGNER**, & M. SPECCHI. 1981. Estimation préliminaire de la production maximale d'anchois et de sardine en Adriatique. FAO Fish. Rep., 253: 155-158.
26. PICCINETTI, C., **S. REGNER** & M. SPECCHI. 1981. Distribution des oeufs de sardine en Adriatique. Rapp. Comm. int. Mer Médit., 27(5): 167-170.
27. **REGNER, S.** 1982. The comparison between the catch of small pelagic fish by mid-water trawls and purse seines in the year 1890. Morsko Ribarstvo, 34(1): 16-18.
28. **REGNER, S.** 1982. Investigations of qualitative and quantitative composition of the larval fish stages in the plankton at the high sea of the central Adriatic. Studia Marina, 11-12: 45-60.
29. KATAVIĆ, I. & **S. REGNER.** 1982. Growth of sea bass, *Dicentrarchus labrax* L., larvae as influenced by temperature. Acta Adriat., 23(1/2): 421- 429.
30. PICCINETTI, C., **S. REGNER** & M. SPECCHI. 1982. Preliminary data on larval and postlarval mortality of anchovy, *Engraulis encrasicolus* (Linnaeus, 1758), in the northern and central Adriatic. Acta Adriat., 23(1/2): 449-456.
31. **REGNER, S.** 1983. Length-weight relationship in larvae and postlarvae of the anchovy, *Engraulis encrasicolus* (Linnaeus, 1758). Rapp. Comm. int. Mer Médit., 28(5): 171-173.
32. **REGNER, S.** 1983. Procjena biomase srdele na osnovi količine njezinih jaja u planktonu za razdoblje 1979-1982. Morsko Ribarstvo, 35(1): 6-9.
33. **REGNER, S**., C. PICCINETTI & M. SPECCHI. 1983. Estimate of spawning biomass of sardine in the Northern and Central Adriatic from 1979 to 1882 by means of egg surveys. FAO Fish. Rep., 290:223-232.
34. **REGNER, S.** 1985. Ecology of planktonic stages of the anchovy, *Engraulis encrasicolus* (Linnaeus, 1758), in the central Adriatic. Acta Adriat., 26(1), Series Monographiae, 1:1-113.
35. **REGNER, S.** 1985. Stock-recruitment relationship in the Adriatic sardine. Rapp. Comm. int. Mer Médit., 29(8): 77-80.
36. **REGNER, S.**, C. PICCINETTI & M. SPECCHI. 1985. Statistical analysis of the anchovy stock estimates from data obtained by egg surveys. FAO Fish. Rep., 345:169-184.
37. **REGNER, S**. *et al.,* 1985. Resursi, stanje i razvoj morskog ribarstva Jugoslavije. Privreda Dalmacije, 1985(1): 13-27.
38. SINOVČIĆ, G., V. ALEGRIA-HERNANDEZ, J. JUG-DUJAKOVIĆ, S. JUKIĆ, I. KAČIĆ, **S. REGNER** & M. TONKOVIĆ. 1986. Contribution to the knowledge of ecology of grey mullet, *Liza* (*Liza*) *ramada* (Risso, 1826), from the middle Adriatic (Šibenik area). Acta Adriat., 22(1-2): 147-162.
39. **REGNER, S.,** D. REGNER, I. MARASOVIĆ & F. KRŠINIĆ. 1987. Spawning of sardine, *Sardina pilchardus* (Walbaum, 1792), in the Adriatic under upwelling conditions. Acta Adriat., 28 (1/2): 161-198.
40. CETINIĆ, P., I. KATAVIĆ, **S. REGNER** & I. STRGAČIĆ. 1987. Fisheries in the Adriatic. In: Food and Development, Yugoslav Scientific Forum, Beograd: 627-638.
41. **REGNER, S.,** G. PICCINETTI-MANFRIN & C. PICCINETTI. 1988. The spawning of the sardine (*Sardina pilchardus* Walb.) in the Adriatic as related to the distribution of temperature. FAO Fish. Rep., 394: 127-132.
42. **REGNER, S.,** 1988. Bibliography of long-term time series in the Adriatic. FAO Fish. Rep., 394: 57-62.
43. **REGNER, S.** 1989. Reproduction of fishes

and ecology of their early stages. Institute of oceanography and fisheries - Centre for the training of fishing personnel from developing countries, Split, 107 p.

44. **REGNER, S.,** 1989. Rezultati ulova male plave ribe lebdećom koćom u periodu od 1978 do 1987. godine. Morsko ribarstvo, 41(2): 37-47.
45. **REGNER, S**. (and the group of authors), 1989. The natural characteristics of the sea water in the Kaštela bay and the impact of wastewaters. UNEP, Mediterranean Action Plan, Priority Action Programme, CPP/1988-89/YU/Doc. 2.
46. **REGNER, S.** 1990. Stock assessment of the Adriatic sardine and anchovy using egg surveys. Workshop: Reproductive biology of small pelagics and stock assessment through ichthyoplanktonic methods, Rome, October 22-26, 1990. ICRAP Quaderno Pesca, Atti del Seminario, 4: 15-31.
47. **REGNER, S.** & J. DULČIĆ. 1990. Growth parameters of anchovy post larvae in the Adriatic estimated from otolith growth rings. Bilješke-Notes, 76: 1-8.
48. CHARBONIER, D., M. M. AUBERT, V. ALEGRIA-HERNADEZ, P. D'AYALA, G. BOMBACE, A. CAMPILLO, S. GARCIA, J. JANSÁ, P. OLIVER, **S. REGNER**, F. VIVES & T. VUČETIĆ. 1990. Peche & Aquaculture en Mediterranee. Plan d'Action pour la Mediterranee, Les Fascicules du Plan Bleu, 1: 94p.
49. **REGNER, S**. 1993. Spawning of the anchovy in the Northern Adriatic in 1989, the year of intensive phytoplankton and benthic diatoms blooms. 6th Int. Congress on Zoogeography and Ecology of Greece and adjacent regions, Thesaloniki, April 1993, p.57.
50. **REGNER, S**. & J. DULČIĆ. 1994. Growth of sea bass, *Dicentrarchus labrax* L., larval and juvenile stages and their otoliths in quasi-steady temperature conditions. Marine Biology, 119(2): 169-177.
51. MANDIĆ, M., M. ĐUROVIĆ & **REGNER, S**. 2011. Spawning habitat and biomass estimation of anchovy (*Engraulis encrasicolus* L.) in Boka Kotorska bay. Studia Marina, 25 (1): 83-100.
52. MANDIĆ, M., M. ĐUROVIĆ, A. PEŠIĆ, A. JOKSIMOVIĆ & **S. REGNER**. 2013. Boka Kotorska Bay - spawning and nursery area of pelagic fish species. Studia Marina, 26 (1): 33-46.
53. MANDIĆ, M., **REGNER, S.** 2014. Variation in fish eggs size in several pelagic fish species. Studia Marina, 27 (1): 31-46.
54. SMEDEREVAC-LALIĆ, M., **S**. **REGNER,** M. LEINHARDT, D. NIKOLIĆ, G. CVIJANOVIĆ, M. JAĆINOVIĆ & A. HEGEDIŠ. 2019. Review of allochthonous fish species with the marine origin in Serbian freshwater system. Studia Marina, 32 (1): 33-46.