



**Zeinab A. AHMED<sup>1</sup> and Ahmed A. ISSA<sup>2</sup>**

**Phosphorus stress effects on assimilation of nitrate by the green alga *Kirchneriella lunaris* Moeb. isolated from desert soil.**

Acta Hydrobiol., 36, 49-55.

**Abstract** - Exposure of the alga *Kirchneriella lunaris*, isolated from desert soil, to a nutrient solution without phosphorus resulted in distinct growth and protein inhibition in relation to control cultures. In addition, P-deficient algae accumulated much smaller amounts of nitrate accompanied with a rise in free amino acids than the control cultures. The cell multiplications, dry matter, total pigments, proteins, and assay of nitrate reductase of *Kirchneriella* cultures were generally increased, with a rise in the corresponding P-levels of up to 1250  $\mu\text{g dm}^{-3}$ . Above that the parameters again decreased.

**Key words:** *Kirchneriella lunaris*, phosphorus stress, soil algae, nitrate reductase.

**Authors' addresses:**

<sup>1</sup> Assiut University, Faculty of Science, Botany Department, Sohag, Egypt,

<sup>2</sup> Assiut University, Faculty of Science, Botany Department, Assiut, Egypt.

---

**Anthony W. AKPAN<sup>1</sup> and Donald I. ANADU<sup>2</sup>**

**Determination of the effect on the environment of municipal effluents and inorganic sedimentation with regard to water quality and macroinvertebrate fauna in the River Delimi, Jos Nigeria).**

Acta Hydrobiol., 36, 387-398.

**Abstract** - Municipal and industrial effluents discharged into the River Delimi at midstream seriously affect the environment with enhanced levels of some chemical variables. Species richness, diversity, and biotic scores of macroinvertebrates were lowest at the affected zone for all taxa, while density and biomass were higher only for pollution-tolerant species of Mollusca, Oligochaeta, and Diptera. Unaffected and recovery zones were heterotrophic ( $P/R < 1$ ), while the affected zone was autotrophic ( $P/R > 1$ ) owing to dense algal mats. The results indicate a strong anthropogenic effect leading to habitat degradation.

**Key words:** rivers, pollution, indicator species, biotic index, habitat degradation, self-purification.

**Authors' addresses:**

<sup>1</sup> University of Uyo, Department of Zoology and Fishery, Akwa Ibom State, Nigeria,

<sup>2</sup> Nnamdi Azikiwi University, Department of Biological Sciences, Akwa, Nigeria.

---

**Antony W. AKPAN and Bassey E. AKPAN**

**Spatial and temporary heterogeneity in plankton distribution in a Nigerian tropical freshwater pond (southern Nigeria).**

Acta Hydrobiol., 36, 201-211.

**Abstract** - Plankton density in the pond varied significantly with time and depth but not with site, indicating no site-specific differences. ANOVA showed the importance of temporal over spatial variation ( $P < 0.01$ ). The two components were not significantly different during the rainy season, owing the effect of

cloud cover and precipitation which flushed out the plankton. Temporal variation predominated during the dry season owing to increasing variation in solar radiation and plankton abundance.

**Key words:** freshwater plankton, spatial and temporal variation, seasonal periodicity, municipal effluents.

**Authors' address:** Authors' address: University of Uyo, Department of Zoology and Fisheries, P.M.B. 1017, Uyo, Akwa Ibom State, Nigeria.

---

**Henryk CHUDYBA and Alicja CZAPLICKA**

**Sociological studies on the phytoplankton in Lake Stopka (Elk Lake District, northeastern Poland).**

Acta Hydrobiol., 36, 31-47.

**Abstract** - On the basis of qualitative analysis of 80 algological samples the occurrence of 350 taxa of algae was recorded in the eutrophic Lake Stopka. *Asterionella formosa* was acknowledged to be a species of the greatest diagnostic value in the phytosociological aspect, hence the discussed community was called *Asterionella formosa planctonicum eutrophicum*.

**Key words:** lakes, phytoplankton, communities, ecology, taxonomy.

**Authors' address:** Academy of Agriculture and Technology, Botany Department, Kortowo, bl. 17, 10-718 Olsztyn, Poland.

---

**Stanisław CZACHOROWSKI**

**Concomitance of caddis fly (Trichoptera) larvae in four Masurian lakes differing trophically (north-eastern Poland).**

Acta Hydrobiol., 36, 213-225.

**Abstract** - Changes in the communities of caddis fly larvae typical of various lake habitats showed a gradient-like configuration. The concomitance structure of the caddis fly fauna of the lake as a whole was marked by certain individualism. The individual character of communities was due to regional differences, the trophic differences and habitat composition of the particular lake, as well as to the close vicinity of habitats in the lakes, and most probably arose from the sharing of resources in the individually forming habitats. Five types of community were initially distinguished for the various habitats of the studied lakes, taking into consideration their regional (local) and general character environment.

**Key words:** lakes, communities, caddis fly larvae, habitat, distribution, heterogeneous environment.

**Author's address:** Teacher Training College, Department of Ecology and Environmental Protection, ul. Żołnierska 14, 10-561 Olsztyn, Poland.

---

**Bazyli CZECZUGA**

**Studies of aquatic fungi. 17. Aquatic fungi of Lake Hańcza in the Suwałki Scenic Park and of some adjacent lakes (northeastern Poland).**

Acta Hydrobiol., 36, 371-385.

**Abstract** - Fifty-one species of fungi were found in the oligotrophic Lake Hańcza and some adjacent lakes. The following fungi unknown from Poland were found in these lakes: *Micromyces zygogonii*, *Blastocladia pringsheimii*, *Lagenidium marchalianum*, *Calyptrolegnia achlyoides*, *Apodachlya pyrifera*, and *Tricladium giganteum*.

**Key words:** hydrochemistry, mycology, aquatic fungi.

**Author's address:** Medical Academy, Department of General Biology, ul. Kilińskiego 1, 15-230 Białystok, Poland.

---

**Elżbieta DUMNICKA**

**Habitat preferences of invertebrates (especially Oligochaeta) in a stream.**

Acta Hydrobiol., 36, 91-101.

**Abstract** - The highest density of macrofauna was recorded in a muddy habitat, and the highest biomass (d.w.) in a stony one. Only Naididae, Hydracarina, young larvae of Trichoptera, and large specimens of *Gammarus* spp. preferred a transitional habitat (mud-covered stones). Of the 25 identified species of Oligochaeta especially three dominant species (*Nais bretscheri*, *N. pardalis*, and *N. communis*) were most numerous in the transitional habitat. Downstream the species diversity of Oligochaeta increased and the composition of the community changed.

**Key words:** streams, macrofauna, Oligochaeta, density, biomass, habitats, preferences.

**Author's address:** Karol Starmach Institute of Freshwater Biology, Polish Academy of Sciences, ul. Sławkowska 17, 31-016 Kraków, Poland.

---

**Wanda GALICKA**

**Primary production and state of water purity in the upper River Warta (central Poland).**

Acta Hydrobiol., 36, 17-29.

**Abstract** - Qualitative analyses of the River Warta water upstream and downstream from the Jeziorsko Reservoir in 1991 showed an improvement in the water quality as compared with earlier years in the case of pH, phosphates, iron, and total suspension, but some physico-chemical water variables did not accord with the planned Class I of water purity. In the River Warta production processes continued throughout the year, the production values below the dam being 100% higher than those at the station located upstream from the reservoir.

**Key words:** rivers, reservoirs, water quality, eutrophication.

**Author's address:** University of Łódź, Department of Ecology and Vertebrate Zoology, ul. Banacha 12/16, 90-237 Łódź, Poland.

---

**Ilgiz IRNAZAROW and Henryk BIAŁOWAŚ**

**Genetic characteristics of carp breeding lines at the Institute of Ichthyobiology and Aquaculture of the Polish Academy of Sciences Gołysz. 1. Polish lines.**

Acta Hydrobiol., 36, 125-142.

**Abstract** - 5 protein systems, i.e. transferrin and esterase of blood serum, LDH, SOD, and Hb of blood cells (8 loci), were investigated in four Polish breeding lines of carp, i.e. 2, 3, 6, and St. Polymorphism was found for *Tf\**, *EST-1\**, *LDH-B1\**, and *SOD-2\** loci. Only line 3 was in a condition of genetic balance with regard to the investigated loci. On the basis of the frequency alleles the homo- and heterozygosity of the lines was calculated. The highest degree of homozygosity was shown by line 3 and the lowest by line 2.

**Key words:** common carp, genetic characteristics, biochemical markers.

**Authors' address:** Polish Academy of Sciences, Institute of Ichthyobiology and Aquaculture, Gołysz, 43-520 Chybie, Poland.

---

**Ahmed A. ISSA, Refat M. ABDEL-BASSET and Mahmoud S. ADAM**

**Biotic interaction and nutrient competition between *Chlorella fusca* Shih et Krauss and *Ankistrodesmus falcatus* (Corda) Ralfs.**

Acta Hydrobiol., 36, 323-333.

**Abstract** - In non-limited nutrient experiments (basal medium + 100  $\mu\text{g P}_{\text{tot.}} \text{dm}^{-3}$  and 2000  $\mu\text{g N}_{\text{tot.}} \text{dm}^{-3}$ ) the highest production (growth rate, chlorophyll *a*, dry weight) of *Chlorella fusca* and *Ankistrodesmus falcatus* growth in pure cultures was obtained. Similar enhancement of mixed cultures (1:1) was observed despite the production of each one being lower than its own in pure culture. *C. fusca* requires relatively higher amounts of nitrogen than *A. falcatus*. However, the uptake of phosphorus by *C. fusca* was lower than *A. falcatus*. On the other hand, *C. fusca* can inhibit the growth of *A. falcatus*, while *A. falcatus* somewhat improved the growth of *C. fusca*.

**Key words:** biotic interaction, nutrient, culture, *Chlorella*, *Ankistrodesmus*.

**Authors' address:** Assiut University, Faculty of Science, Botany Department, Assiut, Egypt.

---

**Raja JAMES, Kunchitham SAMPATH and Srinivasan ALAGURATHINAM**

**Accumulation and prediction of lead elimination in *Oreochromis mossambicus* as a function of body size.**

Acta Hydrobiol., 36, 115-124.

**Abstract** - Lead accumulation in the gill, liver, and muscle of *O. mossambicus* was time and dose dependent but decreased with body size. During recovery, the large size group eliminated the metal faster than the small size one. Animals exposed to higher concentration of metal needed longer time for recovery.

**Key words:** *Oreochromis mossambicus*, lead, accumulation, elimination, prediction, body size.

**Authors' address:** V.O. Chinambaram College, Department of Zoology, Tuticorin - 628 008, Tamil Nadu, India.

---

**Raja JAMES and Kunchitham SAMPATH**

**Combined toxic effects of carbaryl and methyl parathion on survival, growth, and respiratory metabolism in *Heteropneustes fossilis* (Bloch).**

Acta Hydrobiol., 36, 399-408.

**Abstract** - The 96 h  $\text{LC}_{50}$  values of carbaryl, methyl parathion individually and equitoxic of both were 19.99, 10.00, and 16.68 ppm respectively. Animals exposed to sublethal levels of carbaryl and methyl parathion individually and in combination significantly reduced the rates of feeding, absorption, and conversion and increased oxygen consumption and surfacing frequency. Methyl parathion was more toxic than carbaryl in individual concentration and in combination produced synergistic and antagonistic effects.

**Key words:** *Heteropneustes fossilis*, carbaryl, methyl parathion, food, utilization, synergism, antagonism.

**Authors' address:** V.O. Chidambaram College, Department of Zoology, Tuticorin - 628 008, Tamil Nadu, India.

---

**Bakhtiyar G. KAMILOV**

**Fecundity of eastern bream, *Abramis brama orientalis* Berg, from reservoirs in southern Uzbekistan.**  
Acta Hydrobiol., 36, 245-253.

**Abstract** - Gonad weight, absolute and relative fecundity, and the maturity coefficient of female eastern bream *Abramis brama* in the Talimardzhan, Utchkyzyl, and Yuzhnosurkhan reservoirs located in southern Uzbekistan were studied. Females mature at the age of 3, when the fish reach 27, 21, and 22 cm in the three reservoirs respectively. Also, the correlation coefficient and regression between these characteristics and fish sizes were determined.

**Key words:** reservoirs, eastern bream, absolute and relative fecundity, maturity coefficient.

**Author's address:** Uzbek Academy of Science, Institute of Zoology, 1 Niyazov St., Tashkent, 700095, Uzbekistan.

---

**Thaer I. KASSIM<sup>1</sup> and Hussain A. AL-SAAD<sup>2</sup>**  
**On the seasonal variation of the epipelagic algae in marsh areas (southern Iraq).**  
Acta Hydrobiol., 36, 191-200.

**Abstract** - Qualitatively, the epipelagic algae was dominated by Bacillariophyceae (87.3%), followed by Cyanophyceae (8.2%) and Chlorophyceae (2.7%). The dominant species were *Cocconeis placentula* var. *euglypta* and *Nitzschia palea*. Bacillariophyceae also showed the highest total cell number with two peaks, namely in August and April in an open area, and March and July in a closed area. A significant correlation between chlorophyll *a* and the total number was found in the closed area but not in the open one.

**Key words:** marshes, epipelagic algae, seasonal variations.

**Authors' addresses:**

<sup>1</sup> Fish Research Centre, Department of Aquatic Ecology, Iraq Atomic Energy Commission, Box 765, Baghdad, Iraq,

<sup>2</sup> University of Baghdad, College of Education for Women, Department of Biology, Baghdad, Iraq.

---

**Ibeawuchi R. KEKE<sup>1</sup>, Chike P. OFOJEKWU<sup>1</sup>, Edochiem B. UFODIKE<sup>1</sup> and Godwin N. ASALA<sup>2</sup>**  
**The effects of partial substitution of groundnut cake by water hyacinth (*Eichhornia crassipes*) on growth and food utilization in the Nile tilapia, *Oreochromis niloticus niloticus* (L.).**  
Acta Hydrobiol., 36, 235-244.

**Abstract** - The fingerlings were evaluated for growth and food utilization. The best growth and food utilization was obtained for fish on diet C45, which was a 45% of water hyacinth replacement of groundnut cake. Protein digestibilities of the whole diet were not significant. The economic advantage of using this cheap locally abundant but under-utilized weed as feed in solving the problem of developing a low input based fish culture technology for adoption by rural fish farmers were highlighted.

**Key words:** Nile tilapia, substitution, water hyacinth, groundnut cake, growth.

**Authors' addresses:**

<sup>1</sup> University of Jos, Fisheries and Hydrobiology Research Unit, Department of Zoology, P.M.B. 2084, Jos, Nigeria,

<sup>2</sup> Federal Agricultural Co-ordination Unit, P.M.B. 5517, Ibadan, Nigeria.

---

**Nina KHMELEVA<sup>1</sup>, Andrey NESTEROVICH<sup>1</sup> and Stanisław CZACHOROWSKI<sup>2</sup>**

**The macroinvertebrate fauna of some Byelorussian, Karelian, and Altaian springs and its relation with certain factors .**

Acta Hydrobiol., 36, 75-90.

**Abstract** - The species composition of the investigated springs depends on such factors as geographical location, type of spring, and the characteristics of the surrounding ground vegetation. In Byelorussian springs the co-occurrence of species was analyzed. On the level of co-occurrence of 50% and over a group of 10 species which can be considered as the most characteristic of Byelorussian springs was distinguished.

**Key words:** springs, environmental factors, invertebrate communities.

**Authors' addresses:**

<sup>1</sup> Byelorussian Academy of Sciences, Institute of Zoology, Laboratory of Comparative Hydroecology, Skoryny 27, Minsk, Byelorussia,

<sup>2</sup> Teacher Training College, Institute of Biology, Department of Ecology and Environmental Protection, ul. Żołnierska 14, 10-561 Olsztyn, Poland.

---

**Barbara KOLASA-JAMIŃSKA**

**Improvement of the biotechnique of carp fingerling culture. Characteristics of the pattern of hydrochemical conditions in the course of intensive carp fingerling culture.**

Acta Hydrobiol., 145-158.

**Abstract** - In ponds with greatest stock density high values of oxygen consumption causing decreases in O<sub>2</sub> concentration were noted. The use of aerators eliminated oxygen stratification. High values of phosphate content were observed. In ponds with silver carp polyculture the oxygen conditions were more beneficial and the content of N-NH<sub>4</sub> was smaller than in ponds with an additional stock of grass carp. In all the types of ponds PO<sub>4</sub> concentration suggested accumulation of this compound.

**Key words:** ponds, carp, nutrients, water quality parameters.

**Author's address:** Polish Academy of Sciences, Fish Culture Experimental Station Gołysz, 43-520 Chybie, Poland.

---

**Barbara KOLASA-JAMIŃSKA**

**Improvement of the biotechnique of carp fingerling culture. Physico-chemical conditions in ponds aerated with blade aerators.**

Acta Hydrobiol., 36, 159-167.

**Abstract** - An increase in the content of oxygen, chlorophyll, and nutritive compounds was noted in the water of aerated ponds. The aeration did not affect the water reaction, total alkalinity, or carbon dioxide. It was found that aeration of this type did not move bottom sediments. Aerated ponds were characterized by better production results.

**Key words:** ponds, carp, blade aerators, oxygen consumption, oxygen conditions, chemical elements.

**Author's address:** Polish Academy of Sciences, Fish Culture Experimental Station Gołysz, 43-520 Chybie, Poland.

---

**Andrzej KOWNACKI<sup>1</sup>, Zdzisław KAJAK<sup>2</sup>, Adam ŁAJCZAK<sup>3</sup> and Jan Marian WŁODEK<sup>1</sup>**  
**Natural science bibliography of the River Vistula (Poland).**



**Abstract** - The bibliography contains scientific works and popular scientific articles on the River Vistula since the second half of the 19th century to 1993 concerning the following fields were included: morphology and paleogeography of the riverbed, hydrology, hydrogeology, and morphogenetic processes (erosion, transport, sedimentation, siltation of dam reservoirs), chemistry of the water and bottom sediments, microbiology, flora (algae, aquatic vascular plants), fauna (protozoans, aquatic invertebrates, fish, birds), fishery, pollution and aquatic management. The subject index is included.

**Key words:** bibliography, Vistula, river, reservoirs, environment, biology, management, pollution.

**Authors' addresses:**

<sup>1</sup> Karol Starmach Institute of Freshwater Biology, Polish Academy of Sciences, ul. Sławkowska 17, 31-016 Kraków, Poland,

<sup>2</sup> Polish Academy of Sciences, Institute of Ecology, Department of Hydrobiology, Dziekanów Leny, 05-092 Łomianki, Poland,

<sup>3</sup> Polish Academy of Sciences, Institute of Nature Conservation, ul. Lubicz 46, 31-512 Kraków, Poland.

---

**Edward KRZYŻANEK**

**Changes in the bivalve groups (*Bivalvia* - *Unionidae*) in the Goczałkowice Reservoir (southern Poland) in the period 1983- 1992.**

Acta Hydrobiol., 36, 103-113.

**Abstract** - The greatest development of bivalves in the Goczałkowice reservoir occurred at the turn of the 1960s. In 1983 and 1992 detailed investigations of the exposed bottom of the reservoir were conducted. In 1983, in the north-eastern zone of the reservoir 2.23 individuals with a biomass of 26.9 per 1 m<sup>2</sup> were recorded, while in the south-eastern zone there were 0.77 individuals with a biomass of 20.2 g per m<sup>2</sup>. In 1992, in the north-eastern zone of the reservoir there were 1.68 individuals with a biomass of 37.6 g per m<sup>2</sup>. The population of bivalves, when compared with that in the year 1983, had diminished there by about 30%.

**Key words:** dam reservoirs, bivalves communities, population, biomass, domination.

**Author's address:** Karol Starmach Institute of Freshwater Biology, Polish Academy of Sciences, Hydrobiological Station, 43-230 Goczałkowice, Poland.

---

**Janina KWANDRANS, Halina BUCKA and Roman ŻUREK**

**On the primary production and ecological characteristics of phytobenthos and phytoplankton in the littoral of the Goczałkowice Reservoir (southern Poland).**

Acta Hydrobiol., 36, 335-355.

**Abstract** - The primary production of littoral algae was characterized by periodical high intensity, with a maximum in summer (0.204 g C m<sup>-2</sup> 24 h<sup>-1</sup> phytobenthos and 2.77 g C m<sup>-2</sup> 24 h<sup>-1</sup> phytoplankton). The investigation results support the hypothesis that in certain environmental conditions, besides ecological competition between the algae, the phytobenthos and phytoplankton communities are mutually enriched with species. The more labile phytoplankton communities, however, have a greater effect on the quality of the water in the studied reservoir than have the communities of phytobenthos.

**Key words:** dam reservoirs, littoral, primary production, chlorophyll *a*, phytobenthos, phytoplankton communities.

**Authors' address:** Karol Starmach Institute of Freshwater Biology, Polish Academy of Sciences, ul.

**Krzysztof LOSKA<sup>1</sup>, Danuta WIECHUŁA<sup>2</sup>, Jacek PELCZAR<sup>1</sup> and Jerzy KWAPULIŃSKI<sup>2</sup>**  
**Occurrence of heavy metals in bottom sediments of a heated reservoir (the Rybnik Reservoir, southern Poland).**

Acta Hydrobiol., 36, 281-295.

**Abstract** - Analysis of changes in the content of metals in the different layers of bottom sediments (0-5 cm, 5-10 cm, 10-15 cm, and 15-20 cm) showed that the content of chromium, copper, iron, and manganese decreased with depth of the sediment, this confirming a constant increase in the inflow of these metals to the reservoir. The smallest content of cadmium was found in the surface layer of the sediment. Analysis of chemical similarity of the bottom sediments at various stations permitted the statement that in the surface layer the content of metals was similar at stations laying in the shallow zone of the reservoir. A great similarity of the chemical composition also occurred in the sediments sampled in the deep zone.

**Key words:** reservoirs, bottom sediment, heavy metals.

**Authors' addresses:**

<sup>1</sup> Silesian Technical University, Department of Environmental Engineering, ul.Konarskiego 18, 44-100 Gliwice, Poland,

<sup>2</sup> Silesian Medical Academy, Department of Toxicology, ul.Jagiellońska 4, 41-200 Sosnowiec, Poland.

---

**Krzysztof LOSKA<sup>1</sup>, Danuta WIECHUŁA<sup>2</sup>, Jacek PELCZAR<sup>1</sup> and Jerzy KWAPULIŃSKI<sup>2</sup>**  
**Occurrence of heavy metals in the waters of a heated reservoir (the Rybnik Reservoir, southern Poland).**

Acta Hydrobiol., 36, 267-279.

**Abstract** - The range of changes in the occurrence of heavy metals in the water was very wide, no seasonal trend being assessed in the changes of their content. The content of copper diminished with increasing depth of the sampling layer. In the water layer near the bottom an increase in the content of iron and manganese was observed. For the remaining metals no uniform direction of changes in their content depending on water depth was determined. An increased average level of zinc and copper was maintained in the Rybnik Reservoir in relation to the norms for purity class I, the mean content of the remaining metals not exceeding the norm.

**Key words:** reservoirs, water, heavy metals.

**Authors' addresses:**

<sup>1</sup> Silesian Technical University, Department of Environmental Engineering, ul.Konarskiego 18, 44-100 Gliwice, Poland,

<sup>2</sup> Medical Academy, Department of Toxicology, ul.Jagiellońska 4, 41-200 Sosnowiec, Poland.

---

**Natchko D. NATCHEV**

**Interdependence between thermal effect of sewage, and of water temperature and saprobity state along the lower sections of the River Blagoevgradska Bistritza (south-west Bulgaria).**

Acta Hydrobiol., 36, 297-307.

**Abstract** - A reliable alteration of the state of saprobity in the oligosaprobic section is possible after a shift of 15-20 °C in the water temperature, whereas in the alpha-mesosaprobic section a shift of 6-12 °C is



enough. These changes are mainly connected with the interrelation between diatoms and filiform green algae in the first section and with bacterial activity in the second one. After mingling of the river and sewage the minimum water temperatures rise more and the maximum ones less.

**Key words:** river, saprobiological index, temperature, interdependence, statistics, graphs, formulae.

**Author's address:** Bulgarian Academy of Science, Institute of Zoology, 1 Tzar Osvoboditel St., Sofia, Bulgaria.

---

**Paul C. OFOJEKWU<sup>1</sup>, Romanus I. KEKE<sup>2</sup>, Godwin N. ASALA<sup>1</sup> and Jude C. ANOSIKE<sup>1</sup>**

**Evaluation of water hyacinth (*Eichhornia crassipes*) and groundnut cake as dietary components in feeds for *Oreochromis niloticus niloticus* (L.).**

Acta Hydrobiol., 227-233.

**Abstract** - The results showed that good growth and protein utilization was obtained with diets containing 18.04-20% groundnut cake and 14.76 to 15% water hyacinth meals. Further increase in the dietary water hyacinth led to a decline in growth and protein utilization. In general the protein digestibility was poor.

**Key words:** *Oreochromis niloticus niloticus*, nutrition, groundnut cake, *Eichhornia crassipes*.

**Authors' addresses:**

<sup>1</sup> University of Jos, Department of Zoology, Fisheries and Hydrobiology Research Unit, Private Mail Bag 2084, Jos, Nigeria,

<sup>2</sup> Abia State University Uturu, School of Biological Sciences, Private Mail Bag 2000, Okigwe, Nigeria.

---

**Marzena RZECZYCKA, Magdalena PRZYTOCKA-JUSIAK and Monika ŁESYSZAK**

**Growth interactions between *Pseudanabaena catenata* and *Stichococcus bacillaris* in continuous cultures.**

Acta Hydrobiol., 36, 169-178.

**Abstract** - Interactions between the blue-green alga *Pseudanabaena catenata* and the green alga *Stichococcus bacillaris* were investigated in bialgal cultures carried out in a chemostat, on a solid medium, and in continuous cultures with rotating disks. The inhibitory effect of *S. bacillaris* on *P. catenata* was most pronounced in the continuous cultures carried out with liquid media of slightly acidic pH and in the culture with rotating disks in *S. bacillaris* filtrate. The growth of *P. catenata* was also strongly inhibited in cultures on the solidified medium. The least inhibition was observed when continuous cultures were carried out in chemostat in a slightly alkaline medium.

**Key words:** algal interaction, blue-green algae, green algae, laboratory cultures.

**Authors' address:** Warsaw University, Institute of Microbiology, Department of Environmental Microbiology, ul. Karowa 18, 00-324 Warszawa, Poland.

---

**Hari R. SINGH, Prakash NAUTIYAL, Anoop K. DOBRIYAL, Ramesh C. POKHRIYAL, Manju NEGI, Veena BADUNI, Rachna NAUTIYAL, Naresh K. AGARWAL, Preeti NAUTIYAL and Ashutosh GAUTAM**

**Water quality of the River Ganga (Garhwal Himalayas).**

Acta Hydrobiol., 36, 3-15.

**Abstract** - The water quality of the River Ganga was monitored using certain physical, chemical, and

biological characteristics. As compared with abiotic, the biological quality was found to vary considerably. The quanta and spectra of plankton and macrozoobenthos increased with the river's descent. The quanta-spectra relationship for the selected components ( $r=0.72, 0.69$ ) was found to be meaningful. The study indicates an oligotrophic state of the River Ganga.

**Key words:** rivers, water quality, quanta-spectra relationship, benthic macroinvertebrates.

**Authors' address:** H.N.B. Garhwal University, Department of Zoology, Srinagar, 246 174 Garhwal, India.

---

**Raman SIVAKAMI, Gopal PREMKISHORE and Michael R. CHANDRAN**

**Seasonal diel migratory pattern of plankton in the Uyyakkondan channel in the Ayilapettai region (Tiruchirappalli, India).**

Acta Hydrobiol., 36, 357-369.

**Abstract** - Cutting across the different seasons, some of the plankters appeared to be "stenotemporal" in that they occur for shorter hours while others are "eurytemporal" in that they occur for longer hours of the day. The principal factors involved appear to be light, temperature, and food in addition to predation and genetic heterogeneity with populations, as well as genetic variation within populations.

**Key words:** channels, phytoplankton, zooplankton, diel migration, physico-chemical parameters.

**Authors' address:** Bharathidasan University, Department of Animal Science, School of Life Sciences, Tiruchirappalli - 620 024, Tamil Nadu, India.

---

**Ewa SZAREK**

**The effect of abiotic factors on chlorophyll *a* in attached algae and mosses in the Sucha Woda stream (High Tatra Mts, southern Poland).**

Acta Hydrobiol., 36, 309-322.

**Abstract** - In the Sucha Woda stream the content of chlorophyll *a* in the periphyton changed along the course of the stream, the lowest being found in the high mountain part and the highest in the middle part of the stream. In spite of significant differences in the insolation of the stream in its middle part, light did not significantly affect the chlorophyll *a* content in the attached algae, mosses, or the concentration of organic components in the algal envelopes. A positive correlation between the chlorophyll *a* content in the periphyton and N-NO<sub>3</sub>, and a negative one between the water temperature and pH were shown. A significant effect of the water level on the concentration of chlorophyll *a* in the algae was observed.

**Key words:** montane stream, attached algae and mosses, chlorophyll *a*, light, nutrients.

**Author's address:**

Karol Starmach Institute of Freshwater Biology, Polish Academy of Sciences, ul. Sławkowska 17, 31-016 Kraków, Poland.

---

**Wanda URBANIEC-BRÓZDA**

**Improvement of carp fingerling culture. Phytoplankton in ponds with differentiated stock.**

Acta Hydrobiol., 36, 179-189.

**Abstract** - Analysis of the abundance, development dynamics, and qualitative composition of phytoplankton in ponds with differentiated carp stock (fry and reared fry) cultured in monoculture and in mixed stock with grass carp, silver carp, and bighead carp fingerlings, showed a stimulating effect of

phytophagous fish, especially grass carp, on phytoplankton abundance. The differentiated carp stock was found to have no effect on the species composition and structure of dominance of algae.

**Key words:** ponds, carp, intensive fingerling production, phytoplankton, qualitative composition, abundance.

**Author's address:** Polish Academy of Sciences, Fish Culture Experimental Station Gołysz, 43-520 Chybie, Poland.

---

**Magdalena WICHTOWSKA<sup>1</sup> and Agata SOBCZAK<sup>2</sup>**

**Formation of the water beetle (Coleoptera) fauna in conditions of the urban agglomeration of Szczecin (Western Pomerania).**

Acta Hydrobiol., 36, 1, 57-74.

**Abstract** - The paper presents the results of investigations of the occurrence of water beetles in natural and artificial water bodies in the area of Szczecin. Altogether 6266 individuals of water beetles belonging to 132 species from 6 families were collected. Analyses were made of species structure, changes in the population of the fauna in the annual cycle, and faunal similarities between the water bodies. The main source of the fauna of Coleoptera of the urban waters were the natural water bodies and waters of the Baltic littoral.

**Key words:** water bodies, water beetles, urban fauna.

**Authors' addresses:**

<sup>1</sup> University of Szczecin, Department of Invertebrate Zoology, ul. Wielkopolska 15, 70-451 Szczecin, Poland,

<sup>2</sup> University of Szczecin, Department of General Zoology, ul. Łukasińskiego 43, 71-215 Szczecin, Poland.

---

**Jarosław ZADROŻNY**

**The species structure of six special angling waters in Cracow region on the basis of anglers' questionnaire replies.**

Acta Hydrobiol., 36, 255-264.

**Abstract** - 23 species of fish were reported in 10 646 anglers' replies to questionnaire forms concerning six special angling waters in the Cracow region. Analysis of the species structure of the anglers' total catch showed a significant dominance of *Cyprinus carpio* (L.), *Abramis brama* (L.), *Rutilus rutilus* (L.), and *Carassius carassius* (L.) and a small percentage of predators.

**Key words:** species structure, anglers' questionnaire replies, fish management, tocking.

**Author's address:** Jagiellonian University, Department of Environmental Biology, ul. Ingardena 6, 30-060 Kraków, Poland.

---



**Back to Acta Hydrobiologica**