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Growth, photosynthesis, and proline content of *Scenedesmus obliquus* (Turp.) Kütz. as affected by Cu^{2+}.

Acta Hydrobiol., 34, 401-409.

Abstract - *Scenedesmus obliquus* cultures were subjected for 7 days to increasing levels of Cu^{2+} (1-60 l'*M*). The cell number, dry weight, and chlorophyll content were reduced as the level of Cu^{2+} was raised. Photosynthetic oxygen evolution and respiratory oxygen uptake in the dark were also reduced, however, soluble protein contents were negatively affected by Cu^{2+}. However, soluble carbohydrates and free amino acid content were variously increased by increased Cu^{2+} level. Free proline content was increased by up to 148% of that of the control, this being an indication of heavy metal stress.

Key words: *Scenedesmus obliquus*, copper, photosynthesis, respiration, metabolism.

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Laith A.J. AL-HASSAN[1], Adel Y. AL-DUBAIKEL[2] and Nihad K. WAHAB[2]

Ocular lens diameter as an age indicator in two teleost fishes collected from Basrah waters (Iraq).

Acta Hydrobiol., 34, 275-279.

Abstract - The ocular lens diameter of the teleost fishes *Heteropneustes fossilis* and *Ilisha elongata* was used as an age indicator. The results showed that this technique could be adopted for estimating the age of individuals of these two species.

Key words: eye lens diameter, age, *Heteropneustes fossilis*, *Ilisha elongata*.

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Halina BUCKA and Roman ŻUREK

Trophic relations between phyto- and zooplankton in a field experiment in the aspect of the formation and decline of water blooms.

Acta Hydrobiol., 34, 139-155.

Abstract - An investigation was carried out in the Goczałkowice Reservoir at the Stations "Corral" and "Platform". Copper treatment applied to the algae brought a decline in cladocerans and a decrease in their pressure on the phytoplankton and, in consequence, on an abundant secondary development of chlorococcous green algae. The population of cladocerans was considerably reduced by *Acanthocyclops robustus* just before coppering. The invasion of a fungal parasite inhibited the intensive development of *Asterionella formosa* in the Corral, where a later mass occurrence of *Ceratium hirundinella* led to the

almost total disappearance of zooplankton.

Key words: dam reservoirs, phytoplankton, zooplankton, trophic dependencies, water blooms.

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Caroline O. DUBLIN-GREEN
Seasonal and spatial variations in some physico-chemical parameters of the River Bonny (Niger Delta).
Acta Hydrobiol., 34, 3-17.

Abstract - Changes in some ecological parameters of the River Bonny were observed at ten channel stations. Significant salinity variations were recorded. Ammonia nitrogen concentration was generally high (2.4 mg dm^{-3}) while phosphate concentration was below detection limit during the late rainy season. A two-way analysis of variance of measured parameters revealed that seasonal and spatial variations in salinity, alkalinity, pH, and silica are significant.

Key words: Niger Delta, rivers, estuary, chemistry, brackish, concentration.

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Wanda GALICKA[1], Teresa LESIAK[1] and Ewa RZERZYCHA[2]
Dynamics of phytoplankton development in the Sulej˘w Reservoir (central Poland), as related to nutrients and zooplankton pressure.
Acta Hydrobiol., 34, 315-327.

Abstract - In spring and summer two peaks of development were found, characterised by average biomass values of 11.0-37.7 mg dm^{-3} and 8.1-44.7 mg dm^{-3}, respectively. In general, diatoms prevailed, constituting from 68.3-97.5% of phytoplankton biomass, while in periods when their numbers fell the dominants were plant flagellates. The seasonal dynamics of zooplankton development was also observed and at the same time its feeding pressure on the phytoplankton was then determined. The chief components of zooplankton were *Bosmina coregoni* and *Daphnia cucullata*.

Key words: reservoirs, nutrients, development of phytoplankton, zooplankton, pressure of feeding.

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Wanda GALICKA
The inflow of nutrients to the Sulejów Reservoir (central Poland).
Acta Hydrobiol., 34, 303-314.

Abstract - The variations of the four forms of nitrogen (ammonia, nitrite, nitrate, and organic nitrogen), of total phosphorus and phosphates were examined. Throughout the entire period of investigation the values of the nutrients were high, but very changeable. In the mineral nitrogen the nitrate form dominated, and in total nitrogen organic nitrogen. Lower values in summer and higher in autumn were reported for the nitrate and the ammonia nitrogen. Minimum concentrations of phosphates occurred as a rule in spring and the

maximum ones in autumn and winter.

Key words: reservoirs, rivers, nutrients, eutrophication.

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Andrzej GÓRNIAK[1] and Modest MISZTAL[2]

Differentiation of the composition of organic matter in the bottom sediments of the mesotrophic Lake Piaseczno (Łęczyńsko-Włodawskie Lake District, Poland).

Acta Hydrobiol., 34, 29-42.

Abstract - Quantitative and qualitative differentiation of organic matter in the bottom sediments are analysed. It has been demonstrated that the coverage of the immediate catchment basin affects the composition of the organic matter in the sediments in the littoral and the changes in the composition of organic matter with depth. The conditions existing in the examined lake favour the formation of humic acids in the profundal zone of autochthonic origin.

Key words: lakes, organic matter, bottom sediments, humic acids, littoral profundal.

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Małgorzata GRODZIŃSKA-JURCZAK and Marek KRYWULT

Acidification of the Waksmundzki Stream (The Polish Tatra Mountains) affected by atmospheric pollution.

Acta Hydrobiol., 34, 19-28.

Abstract - During the period May-October 1991 a hydrochemical investigations was carried out in the Waksmundzka Valley lying on the granite substratum of the High Tatra Mountains. An acidification of the Waksmundzki Stream dependent on precipitation was observed in spring, while heavy late summer and autumn rainfall reduced the quantity of the acidic substances. Differences in the stream chemistry between the upper and lower part of the catchment were also observed. The small amount of groundwater entering the lower part of the stream is believed to be responsible for it.

Key words: Tatra Mts, acid rain, water acidification, buffering capacity.

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Maria HUL

The composition of microfauna of the biofilm of a Rotating Biological Disc and Rotating Biological Multicage under conditions of high loading with pollutants.

Acta Hydrobiol., 34, 129-138.

Abstract - The qualitative and quantitative compositions of microfauna of the biofilm of the Rotating Biological Disc (RBD) and Rotating Biological Multicage (RBM) as a new structure of the rotating bed were compared. The composition and structure of communities indicating an overload of the bed were observed on the RBD with a loading of section I amounting to 137 g m^{-2} d^{-1} according to COD, and on the

RBM to more than 277 g m^{-2} d^{-1}.

Key words: Rotating bed, loading of the bed, pollutants, microfauna, biofilm.

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Andrzej HUTOROWICZ

Phytoplankton of Lake Żarnowiec against the background of changes in habitat conditions brought about by the action of the pumped-storage power station. 1. Habitat conditions.

Acta Hydrobiol., 34, 375-387.

Abstract - Before the pumped-storage power station was put into commission, a regular cycle of changes in the physico-chemical parameters of the surface water was observed. The working of the power station eliminated of distinctly shortened the occurrence of situations typical of late autumn and summer. The dominating system of parameters in the lake were characteristic of spring and early autumn.

Key words: lakes, pumped-storage power station, mixing of water, physico-chemical parameters.

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Andrzej HUTOROWICZ

Phytoplankton of Lake Żarnowiec against the background of changes in habitat conditions brought about by the action of the pumped-storage power station. 2. Dynamics of phytoplankton.

Acta Hydrobiol., 34, 389-400.

Abstract - The investigation of phytoplankton in Lake Żarnowiec was carried out prior to, in the course of construction, and after starting operation of the pumped-storage power station. On the basis of analysis of the development dynamics are dominance structure of species, the range and degree of derangement in the functioning mechanism of this community were demonstrated.

Key words: lakes, phytoplankton, pumped-storage power station, dynamics of development, dominance of species.

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Maciej KAMIŃSKI

Life cycle of the freshwater bryozoan *Plumatella fungosa* (Pall.). 1. Seasonal changes in numbers and biomass.

Acta Hydrobiol., 34, 227-238.

Abstract - In the studied eutrophic lakes the freshwater bryozoan *Plumatella fungosa* produced annually at least 3 generations of colonies. The successive generations differed from each other in their biomass and mode of forming colonies (developed from statoblasts or larvae). The biomass and density of *P. fungosa* colonies in the littoral zone changed significantly during the season (May-November) and over a period of many years.

Key words: Bryozoa, Phyloctolaemata, *Plumatella fungosa*, biomass, life cycle.

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Maciej KAMIŃSKI
Life cycle of the freshwater bryozoan *Plumatella fungosa* (Pall.). 1. Reproduction and general conclusions.
Acta Hydrobiol., 34, 239-252.

Abstract - The production of larvae, the formation of statoblasts, and the growth rate of colonies of *Plumatella fungosa* were investigated in two Polish eutrophic lakes. On the basis of the obtained results and data referring to the seasonal changes in the biomass, origin, and distribution of the bryozoan colonies the author gives a schematic presentation of the life cycle of *P. fungosa* in the studied lakes.

Key words: Bryozoa, Phylactolaemata, *Plumatella fungosa*, reproduction, growth rate, life history.

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Henryk KASZA
Changes in the aquatic environment over many years in three dam reservoirs in Silesia (southern Poland) from the beginning of their existence - causes and effects.
Acta Hydrobiol., 34, 65-114.

Abstract - Changes in the chemical composition of the water in three dam reservoirs are presented against the background of the chemical composition of their affluents, and the effect of these changes on the phytoplankton in terms of the chlorophyll *a*, are discussed. Changes in the chemical properties of the water, an increase in trophy, and the existing differences in the fertility of the water between the reservoirs are associated with the ways of utilisation of the catchment basins and with their population density. On the basis of the whole collected material a scheme of the eutrophication of the examined reservoirs is presented.

Key words: dam reservoirs, affluents, nutrients, ion composition, chlorophyll, catchment basin utilisation.

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Andrzej KOŁODZIEJCZYK
Malacofauna in the watercourses of the Suwalski Landscape Park (north-eastern Poland).
Acta Hydrobiol., 34, 175-188.

Abstract - The upper sections of the watercourses were inhabited by small numbers of six taxa of Gastropoda. An increase in the number of taxa were observed in sections in contact with flow-through lakes. In the watercourses there occurred species typical for the lakes of this area. Only *Ancylus fluviatilis* (Gastropoda) and *Unio crassus* (Bivalvia) were found solely in the running waters.

Key words: Mollusca, taxonomic composition, watercourses, ecotones.

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Marek KRASKA[1], Grzegorz PODOLSKI[2] and Magdalena PODOLSKA[2]
Germination under various culture conditions of reed caryopses (*Phragmites australis* (Cav.) Trin. ex Steud.) from Lake Pštnowskie (near Konin, Poland) with heated water.
Acta Hydrobiol., 34, 213-225.

Abstract - Non-uniform germination of reed caryopses (from 0% for most samples to over 90%) at relatively stable temperatures (21 ą1.9 ^{o}C and 31.7 ą1.0 ^{o}C) and constant light was observed. On the average 70% of caryopses (panicles) kept in room conditions for 3, 5, 10, 20, 40, and 120 days from harvest showed a loss of the ability to germinate only in conditions of culture with a small amplitude of temperature variations (21 +1.9 ^{o}C).

Key words: *Phragmites australis*, heated waters, germination of seeds.

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Janina KWANDRANS
Characteristics of the phytobentos communities in the Goczałkowice Reservoir (southern Poland).
Acta Hydrobiol., 34, 115-128.

Abstract - The structure and distribution of phytobenthic communities are presented and the effect of the depth gradient on the development dynamics of the bottom algae in the Goczałkowice Reservoir described. The investigations revealed the existence of qualitative and quantitative differences in the algal communities between the littoral and the central part of the reservoir. In the backwater part an intermediate type of community of riverine-lake character has developed. Along the depth gradient changes were observed in the algal communities. Active phytobenthos developed in the photic zone to a depth of about 2 m.

Key words: dam reservoirs, phytobenthos community, depth gradient, numbers, variety, chlorophyll *a*.

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Changes in metal content in the water-bottom sediment system under conditions of laboratory aeration.
Acta Hydrobiol., 34, 201-211.

Abstract - The effect of aeration of above-sediment waters on changes in metal forms occurring in the bottom sediment and also in their concentration in the water and sediment was analysed. The obtained results indicate that aeration is an effective method for improving water quality: the water became clear and the content of organic substances and nutrients was reduced. The changes in quantities and occurrence of metal forms depend on the type of metal.

Key words: heavy metals, aeration, bottom sediments.

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Jerzy KWAPULIŃSKI and Danuta WIECHUŁA
Migration of lead and cadmium in Goczałkowice dam reservoir (southern Poland).
Acta Hydrobiol., 34, 43-54.

Abstract - The most intensive displacement of Pb and Cd in the Goczałkowice Reservoir occurred from water near the bottom to the bottom sediment and to the interstitial water as well as from the interstitial water to the bottom sediment and to water near the bottom. The time of removing Pb and Cd from water near the bottom to the interstitial water was on average 21 days for Pb and 2.75 days for Cd, but from water near the bottom to the botom sediment 0.23 day for Pb and 0.02 day for Cd. In the increase in Pb content in water near the bottom also precipitation played an important role.

Key words: reservoirs, migration, cadmium, lead.

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The occurrence of manganese in the Goczałkowice dam reservoir (southern Poland).
Acta Hydrobiol., 34, 55-63.

Abstract - The Mn content in interstitial water, in that in the layer near the bottom and in the sediment was determined. The concentrations of Mn varied in a wide range both in the annual cycle and in the course of the investigated 4-year period. It was established that manganese content considerably exceeded the permissible environmental level in the whole reservoir and increased distinctly near the dam.

Key words: reservoirs, manganese, accumulation.

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Jerzy MASŁOWSKI
Bottom macrofauna of the Szczecin Lagoon (north-western Poland).
Acta Hydrobiol., 34, 253-274.

Abstract - Species composition, density, and biomass of the Szczecin Lagoon macrofauna from 1984-1988 were studied. Between-station differences in fauna composition were related to differences in salinity, type of bottom, and location and allowed division of the stations into 4 groups. Changes in numbers and biomass of macrofauna were interrelated within the whole area of investigation. The causes of the changes could not be determined with certainty. A strong decrease in the zebra mussel (*Dreissena polymorpha*) population, reported earlier, was confirmed.

Key words: Szczecin Lagoon, bottom macrofauna, Oligochaeta, Chironomidae, *Dreissena polymorpha*, density, biomass.

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Chukwuemekanim S. NWADIARO and Reuben O.O. AYODELE
Contributions to the biology of *Sarotherodon melanotheron* (Ruppell, 1851) (Perciformes, Cichlidae) in the New Calabar River (Nigeria).
Acta Hydrobiol., 34, 287-300.

Abstract - *Sarotherodon melanotheron* had length/weight coefficients of 2.84 (male) and 3.13 (female), suggesting that the allometric and isometric growth condition factors (1.46-2.27) were relatively low. Sex ratio (1:1.9) was just in favour of females. There were five maturity stages with maturity sizes of 10.1 cm (male) and 10.5 cm (female). Fecundity (88-651) increased with weight and cube of length. Egg sizes (1.35-3.45) increased with fecundity, gonad size, and body size. Benthic and phytoplankton feeding are shown.

Key words: Cichlidae, *Sarotherodon melanotheron*, biology, "black-water" river, Nigeria, West Africa.

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Edosa OMOREGIE and Martin A. OKPANACHI
Growth of *Tilapia zilli* exposed to sublethal concentrations of crude extracts of *Azadirachta indica*.
Acta Hydrobiol., 34, 281-286.

Abstract - The effects on growth of *Tilapia zilli* exposed for 12 weeks to sublethal crude extracts of *Azadirachta indica* was investigated in static bioassays and a constant aeration system. Weight increased with the decline of nominal concentrations of the extracts. Long-term exposure of *T. zilli* to sublethal concentration of the extract caused growth retardation. The exposed fish showed abnormal behaviour responses at 1.56 and 0.78 mg dm^{-3}, these responses being minimal at lower concentrations. The use by local fisherman of extracts of *A. indica* to kill fish is therefore ill-advised.

Key words: *Tilapia zilli*, *Azadirachta indica*, extract, growth, sublethal toxicity.

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Barbara RAKOWSKA[1] and Mirosław RAKOWSKI[2]
Phytoplankton of the Sulejów Reservoir (central Poland).
Acta Hydrobiol., 34, 329-340.

Abstract - In the period 1979-1980 the phytoplankton of the Sulejów Reservoirs was investigated. 543 taxa of algae were determined. In the characteristics of phytoplankton the qualitative and quantitative composition, dominant, common, and constant taxa, horizontal distribution and their seasonal changes were taken into consideration. In the upper part of the reservoir the dominants were *Asterionella formosa*, *Cyclotella kuetzingiana*, and *Fragilaria pinnata*, and in the lower one *Melosira granulata*, *Stephanodiscus hantzschii*, *S. astraea* var. *minutulus*, *Fragilaria crotonensis*, *Aphanizomenon flos-aquae* and *Microcystis aeruginosa*.

Key words: reservoirs, phytoplankton, eutrophication, seasonal distribution, vertical distribution.

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Narendra N. SINGH[1], Anil Kishore SRIVASTAVA[2] and Anil Kumar SRIVASTAVA[3]
Blood dyscrasia in the freshwater Indian catfish *Heteropneustes fossilis* after acute exposure to a sublethal concentration of propoxur.
Acta Hydrobiol., 34, 189-195.

Abstract - The exposure of the Indian catfish *Heteropneustes fossilis* to 96 h LC_0 concentration (5 mg dm^{-3}) of a carbamate pesticide propoxur evoked a significant increase in the values of the erythrocyte sedimentation rate and clotting time of the blood, whereas significant decrease were observed in the total erythrocyte, leukocyte, and thrombocyte counts, haematocrit, and haemoglobin content.

Key words: propoxur, catfish, toxicity, sublethal effects, haematology.

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Jacek SANECKI and Halina BUCKA
Prognoses of changes in phytocoenoses of the River Dunajec (southern Poland) as a result of hydrotechnical constructions.
Acta Hydrobiol., 34, 357-373.

Abstract - The review covers investigations carried out by the present authors and different other workers on algae in the River Dunajec and in the Rożnów and Czchów dam reservoirs. Changes occurring with the passage of time were investigated, particular attention being paid to the considerable degree of environmental degradation. Stages in the life of dam reservoirs and measures taken for prolongation of the most favourable of them are described. On the basis of available information, prognoses for the future Czorsztyn Reservoir were elaborated.

Key words: rivers, regulated streams, dam reservoirs, algae, pollution, changes, prognoses.

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Elżbieta SZELĄG-WASILEWSKA
Relationship between phytoplankton and abiotic elements in a dam reservoir.
Acta Hydrobiol., 34, 341-356.

Abstract - The changes in abundance and biomass of phytoplankton as well as in the concentration of chlorophyll *a* in the pelagial and in the main tributary of the reservoir are presented. Physical and chemical indicators of water quality were correlated with parameters characterising phytoplankton. Much more significant correlations occurred in the pelagial of the reservoir than in the river flowing into it. Chlorophyll *a* had the most stable set of correlations in respect of number and type of agents, significant at $P<0.01$ level. To this (down to a depth of 3 m) belonged water temperature, turbidity, pH, CO_2, oxygen saturation, BOD_5, oxidability, biomass of algae and dry mass of seston.

Key words: reservoirs, abundance, biomass of phytoplankton, chlorophyll *a*, physico-chemical parameters, correlations.

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Andrzej ZAWAL
Water mites (Hydracarina) of three small lakes in the neighbourhood of Poznań.
Acta Hydrobiol., 34, 157-174.

Abstract - The dependence of the water mite fauna on the type of vegetation was shown in three eutrophic lakes. Two types of lake were distinguished in connection with the degree of formation of astatic zones. The occurrence of water mites in the annual cycle was analysed.

Key words: water mites, eutrophication, lake species, small body species, species of astatic zones.

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Back to Acta Hydrobiologica