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Ahmed M. AHMED, Ahmed A. MOHAMMED, Medhat D. HEIKAL and Refat A. MOHAMMED
Physiology of some Nile algae. 1. Effect of increased NaCl concentration in the medium.
Acta Hydrobiol., 27, 25-32.

Abstract - Three Nile green algal species, *Chlorella vulgaris*, *Scenedesmus obliquus*, and *Ankistrodesmus falcatus*, were studied with regard to the effect of increased NaCl concentration on their growth and related physiological activities. Contrary to all other parameters followed, the content of fats increased greatly with a rise in NaCl concentration in the medium. The uptake of minerals varied according to the algal species, the level of salinization, as well as to the type of the element itself. According to the maximum salinization levels tolerated, *Chlorella* could be considered as salinity tolerant, *Scenedesmus* as moderately salinity tolerant, and *Ankistrodesmus* as salinity sensitive.

Key words: salinity, Nile algae, *Chlorella*, *Scenedesmus*, *Ankistrodesmus*.

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Danuta AUGUSTYN and Maria A. SZUMIEC

Studies on intensification of carp farming. 3. Meteorological conditions, solar radiation, and water temperature in ponds.
Acta Hydrobiol., 27, 159-172.

Abstract - The changes in the pond environment caused by increasing carp production limit penetration of solar radiation into the deeper water layer, thus enhancing the vertical temperature differences. To avoid fish losses as a consequence of oxygen deficiency due to a decline in plankton photosynthesis taking place under conditions of complete overcasting, the effective deficiency can be predicted by determining the potential oxygen deficiency in ponds. This can be done by monitoring the solar radiation or the Secchi disc transparency. The increasing vertical temperature gradient raises the stability of the water and also makes it difficult to oxygenate the deeper water layers.

Key words: carp production, intensification, oxygen deficiency, solar radiation, suspension, water temperature.

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Teresa BEDNARZ

Estimation of quality of some surface waters near the Upper Silesia using the algal growth test.
Acta Hydrobiol., 27, 331-338.

Abstract - By applying the bioassay technique using *Chlorella pyrenoidosa* Chick. in the period 1977-1979, the pollution of waters belonging to the catchment area of the Rivers Mała Panew and Brynica was estimated. Pollution of waters of the Mała Panew catchment area with zinc, lead, and cadmium was shown. The zinc and lead concentrations exceeded those toxic for *Chlorella*. In the waters of the Brynica catchment area no great pollution was found, although they were found to have a varying nutrient level.

Key words: rivers, reservoirs, *Chlorella pyrenoidosa*, bioassay, heavy metals, pollution.

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Maria BOMBÓWNA

Ecology of some waters in the forest-agricultural basin of the River Brynica near the Upper Silesian Industrial Region. 2. Chemical composition of the water and atmospheric precipitation.

Acta Hydrobiol., 27, 433-450.

Abstract - In the dam reservoir at Kozłowa Góra and in the wierklaniec park pond eutrophication was more advanced than in Lake Chechło-Nakło. The fertility of these water bodies was caused by the agricultural utilization of the catchment basin and the inflow of domestic sewage, this being also noted in the River Brynica. Atmospheric pollution brought about by the metallurgical industry very frequently caused the occurrence of calcium-sulphate type rainwater, and the development of calcium-sulphate-carbonate type water in the water bodies lying on substrates composed of calcareous marls and dolomites, with the predominance of sulphate anion in Lake Chechło-Nakło.

Key words: rivers, dam reservoirs, lakes, ponds, atmospheric precipitation, hydrochemistry, pollution, industrial dusts, nutrient compounds.

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Elżbieta BRZUSKA¹ and Bogdan MALCZEWSKI²

Stimulation of maturation and ovulation of carp (*Cyprinus carpio* L.) oocytes. 1. In autumn.

Acta Hydrobiol., 27, 401-417.

Abstract - The length of the period in which females are prepared for autumn reproduction influenced the rate of oocyte maturation after injections of carp pituitary extract, the amount of pituitary extract needed to induce ovulation, and the quality of eggs obtained. In females prepared during 1352 day-degrees the oldest generation of oocytes matured faster, their ovulation occurring after 0.9 mg of pituitary extract per 1 kg of body weight applied in two doses. In females prepared during 792 day-degrees the oocytes matured more slowly and a larger amount of pituitary (2.9 mg kg^{-1} applied in three doses) was needed to induce ovulation.

Key words: carp, oocytes, maturation, ovulation, preparatory period.

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Halina BUCKA

Ecology of some waters in the forest-agricultural basin of the River Brynica near the Upper Silesian Industrial Region. 6. Communities of plankton algae.

Acta Hydrobiol., 27, 493-508.

Abstract - The investigation concerned the effect of industrial atmospheric pollution and agricultural run-off on the development of communities of plankton algae in the reservoir at Kozłowa Góra and Lake Chechło-Nakło, in the wierklaniec park pond, and in the River Brynica. They showed increased trophy with weak pollution of the first reservoir, the green algae-diatoms character of its phytoplankton being preserved, a small number of algae and low fertility of the lake, and strong eutrophy and the highest pollution in the

park pond. The River Brynica was purest in its forest section but in the lower part and below the dam it was very fertile and polluted.

Key words: rivers, dam reservoirs, lakes, ponds, algal communities, industrial dust, agricultural run-off.

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Krystyna CHMIELIŃSKA

Dependence of the chemical composition of the water in the River Rudawa (Southern Poland) on its flow.

Acta Hydrobiol., 27, 283-297.

Abstract - The catchment area of the River Rudawa, a left tributary of the River Vistula, is intensively farmed. The dependence of the chemical composition of water on the magnitude of the flow was analysed. There were no distinct changes in the concentration of different compounds with the varying level of water flow, a significant correlation between these parameters being noted only for nitrate nitrogen, while the amount of loads of compounds depended upon the magnitude of the flow. Two periods of investigation, 1957-1964 and 1971-1980, were compared, an increase in the content of such compounds as sulphates, chlorides, and mineral nutrients being observed.

Key words: river, agricultural catchment area, water flow, concentrations, loads of basic chemical compounds.

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Elżbieta DUMNICKA

Ecology of some waters in the forest-agricultural basin of the River Brynica near the Upper Silesian Industrial Region. 9. Communities of oligochaetes.

Acta Hydrobiol., 27, 535-545.

Abstract - The composition and structure of oligochaete communities of the examined waters depend on several factors such as the natural character of the water body and the kind and level of water pollution. Only in the upper course of the River Brynica is a community typical for lowland rivers present. Communities characteristic for organically polluted waters appear below the reservoir at Kozłowa Góra. In Lake Chechło-Nakło a high content of microelements causes elimination of the more sensitive species (especially from the family Naididae).

Key words: rivers, dam reservoirs, lakes, ponds, oligochaetes, organic pollution, heavy metals, resistance.

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Tadeusz FLEITUCH

Macroinvertebrate drift in the middle course of the River Dunajec (Southern Poland).

Acta Hydrobiol., 27, 49-61.

Abstract - The diel activity of macroinvertebrate drift in the middle course of the River Dunajec in certain months in 1980 and 1981 was investigated. A predominance of nocturnal activity in the investigated taxonomic groups (Ephemeroptera, Plecoptera, Trichoptera, and Simuliidae) was established. A similarity

in specific composition of drift and benthos ($P=78\%$), differences in the temporal and spatial distribution of drift in the cross-section of the river-bed, a lack of correlation between drift and benthos density and of any significant influence of moonlight on the drifting of *Baetis fuscatus* (L.) were found.

Key words: rivers, macroinvertebrate drift, diel activity, drift-benthos density relationship.

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Elżbieta GRABACKA

Ecology of some waters in the forest-agricultural basin of the River Brynica near the Upper Silesian Industrial Region. 8. Ciliata in bottom sediments.

Acta Hydrobiol., 27, 521-533.

Abstract - The Ciliata in the microbenthos of a number of water bodies were investigated, namely: the dam reservoir at Kozłowa Góra, two recreational water bodies (the artificial Lake Chechło-Nakło, and the wierklaniec park pond), and the middle section of the River Brynica. The catchment basin of the River Brynica together with the mentioned water bodies are situated in a forest-agricultural area adjoining the Upper Silesian Industrial Region. On the basis of analysis of the bottom Ciliata species the River Brynica and the examined water bodies were classified as slightly polluted, and the park pond as strongly eutrophicated.

Key words: rivers, dam reservoirs, lakes, ponds, microbenthos, Ciliata, pollution.

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Maria GRZYBKOWSKA

The growth of *Procladius cinereus* Goetghebuer, 1936 (Diptera, Chironomidae) larva.

Acta Hydrobiol., 27, 81-89.

Abstract - Morphometric changes in instars I-IV of *Procladius cinereus* Goeth. (Chironomidae, Tanytopodinae) are described. The larvae of the first instar cannot be identified as to species owing to their morphological similarity within the genus and even the tribe. The growth of larvae does not follow Dyar's rule. The length as weight relationship can be best expressed by a power equation.

Key words: Chironomidae, *Procladius cinereus*, instars, growth, weight.

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Krzysztof KASPRZAK

Density, biomass, and respiration of phytophilous macrofauna of associations of *Potamogeton perfoliatus* L. of a polymictic, eutrophic lake.

Acta Hydrobiol., 27, 63-73.

Abstract - In a eutrophic and polymictic lake situated in an area of intense agriculture the numbers, biomass, and respiration of phytophilous macrofauna of *Potamogeton perfoliatus* L. associations were investigated. The mean total biomass of macrofauna on the investigated plant communities was 13.5 g DW m⁻². Predators constituted the greatest share in the biomass (79%) and phytophages in density (76%). Predators were also characterized by an intensive metabolism reaching up to 75% of the mean macrofauna

respiration of *P. perfoliatus* associations during the vegetation season (1682 kJ m⁻²).

Key words: lake and canal ecosystems, phytophilous macrofauna.

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Krzysztof KASPRZAK

Occurrence and role of bivalves of the family Unionidae (Mollusca, Bivalvia) in the eutrophic Lake Zbęchy (Wielkopolska-Kujawy Lowland) and its outflow canal.

Acta Hydrobiol., 27, 351-370.

Abstract - The density of Unionidae, their biomass, respiration, water filtration intensity, seston consumption, and content of accumulated phosphorus were evaluated in a eutrophic polymictic lake and in its outflow canal lying in agricultural terrain. The biomass of Unionidae in the lake was 1777 kg ha⁻¹ (production 638 kg ha⁻¹), and in the canal 30 kg ha⁻¹ (production 11.5 kg ha⁻¹). During the vegetation season Unionidae in the lake catch from the water 11.5 t DW of seston, assimilating about 36 kg of phosphorus, while in the canal they catch 6.8 kg of seston and assimilate 0.02 kg of phosphorus.

Key words: agricultural land, lake, outflow canal, ecology of bivalves, Unionidae, Sphaeriidae.

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Barbara KAWECKA¹ and Juliusz W. LEO²

Diatom communities in some streams of Southern Greenland.

Acta Hydrobiol., 27, 311-319.

Abstract - The structure of diatom communities developing in streams which flow out of a melting glacier and from snow fields of Southern Greenland is described. *Tabellaria flocculosa*, *Achnanthes nodosa*, *A. rupestris*, *Anomoeoneis seriens* var. *brachysira*, and *Eunotia polydentula* developed the largest populations. The index of diatom biomass was low.

Key words: Southern Greenland, glacier streams, sessile algae, diatom communities.

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Barbara KAWECKA

Ecological characteristics of sessile algal communities in the Olczyński stream (Tatra Mts, Poland) with special consideration of light and temperature.

Acta Hydrobiol., 27, 299-310.

Abstract - The shade thrown by a bridge and the inflow of water from a natural hot spring were used in an investigation on the reaction of algae to changes in light intensity and temperature. *Hydrurus foetidus*, *Homoeothrix janthina*, and *Ceratoneis arcus* were found to be sensitive to light deficiency. *Chantrasia pygmaea*, *Amphora ovalis* var. *pediculus*, and *Achnanthes lanceolata* grew in the shade. *Rhoicosphaenia curvata*, *Cocconeis placentula* var. *euglypta*, *Navicula gracilis* grew in shade and at a raised water temperature. The species *Achnanthes minutissima*, *A. pyrenaica*, *Cymbella ventricosa*, species of the genus *Gomphonema*, and *Diatoma hiemale* with the variety *mesodon* had a wide spectrum with regard to light.

Key words: ecology of algae, sessile algae, influence of light, influence of temperature.

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Alicja KONOPACKA and Krzysztof JAŹDŹEWSKI

Stream ecosystems in mountain grassland (West Carpathians). 13. Gammarid species.

Acta Hydrobiol., 27, 371-380.

Abstract - In two small Carpathian streams (Poland) mixed populations of *Gammarus balcanicus* and *G. fossarum* were studied. Some morphological remarks on the two species are presented as well as their mutual proportions in these populations. Literature data on the simultaneous occurrence of these gammarid species are discussed.

Key words: Carpathian streams, amphipods, *Gammarus balcanicus*, *G. fossarum*, mixed populations.

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Janusz KORNATOWSKI

Phenological and morphometrical differentiation of the water-soldier (*Stratiotes aloides* L.).

Acta Hydrobiol., 27, 33-47.

Abstract - In the water bodies of the Masurian Lake District *Stratiotes aloides* L. develops four morphological forms: the weak form of water-soldier and the ecophenes of the early emerging, the late emerging and the submerged water-soldier which are included in the shapely form. Phenological observations showed a strong influence of the habitat on the time of appearance of the development phases in the distinguished groups. It was also established that some biometric differentiations between water-soldier ecophenes coming from the same lake are smaller than differences within one water-soldier ecophene coming from several water bodies.

Key words: *Stratiotes aloides* L., phenology, specific gravity, biomass, morphological forms.

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Stream ecosystems in mountain grassland (West Carpathians). 14. The use of the experimental stream method in evaluating the effect of agricultural pollution.

Acta Hydrobiol., 27, 381-400.

Abstract - The chemistry, algal, and bacterial populations, and micro- and macrofauna of a natural stream and four experimental streams differing in the load of nutrients (C, N, N+P, P) were investigated in the period 3 October - 3 November 1977. In the experimental streams with increased loads of nutrients there was an increase in the number of bacteria, this leading to an increased number of Ciliata. The greater amounts of nutrients affected the communities of algae and invertebrates to a smaller degree.

Key words: streams, pastoral economy, experimental stream method, nutrients, bacteria, sessile algae, ciliates, invertebrates.

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Ecology of some waters in the forest-agricultural basin of the River Brynica near the Upper Silesian Industrial Region. 7. Zooplankton - quantitative relations in various systematic groups.

Acta Hydrobiol., 27, 509-520.

Abstract - The work concerns the development of zooplankton in the period 1976-1979 in the River Brynica, in the dam reservoir at Kozłowa Góra, in Lake Chechło-Nakło, and in the wierklaniec park pond in the Upper Silesian Industrial Region. These waters are polluted with industrial dust from the atmosphere and run-off. Changes in the composition and number of zooplankton were found resulting mainly from various levels of trophy. The purity level of these waters was determined on the basis of the presence of indicator species.

Key words: rivers, dam reservoirs, lakes, ponds, zooplankton, industrial dust pollution, agricultural run-off.

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Andrzej MAMCARZ

The application of statistical verification in studies in fish variability.

Acta Hydrobiol., 27, 91-99.

Abstract - The method of analysis of time series of variability, developed on the basis of the values of variance, calculated according to one of the Wright formulae, is presented. The series of variability were approximated with polynomials and compared, using the method of covariance analysis for one-way classification using an arbitrary number of polynomial degrees. The method was applied in investigating the variability of body size of peled larvae (*Coregonus peled* Gmel.) reared in lake cages with the use of light for attracting zooplankton.

Key words: variability, fish body size, analysis of covariance, rearing in cages.

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Studies on intensification of carp farming. 8. State of health and haematological indices of carp in experimental ponds.

Acta Hydrobiol., 27, 219-228.

Abstract - In 1971-1973 ichthyopathological and haematological investigations were carried out as part of the complex studies on intensification of table carp production. They aimed at determining the influence of high stock density, pond fertilization, and administration of food pellets on the state of health of the fish. At all levels of intensification a number of unfavourable phenomena such as pathological changes in the gills and internal organs, and low level of haemoglobin concentration (5.5-6.0%) were observed. Nevertheless, the applied rearing methods and high level of intensification did not significantly impair the health of the carp.

Key words: ponds, carp farming, production intensification, pathology, haematology.

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Antoni MIERNIK**Estimation of nutritional value of algal proteins obtained from simulated nitrogen fertilizer plant wastes with different forms and concentrations of nitrogen.**

Acta Hydrobiol., 27, 321-330.

Abstract - The paper presents the amino acid composition of proteins from *Chlorella vulgaris*, *Scenedesmus obliquus*, and *Stichococcus bacillaris* obtained from simulated wastes with a high nitrogen content. The richest source of protein appeared to be *S. bacillaris*. Urea was shown to be the best source of nitrogen for obtaining protein rich in exogenous amino acids, being superior to N-NH_4^+ and N-NO_3^- . The best source of protein rich in exogenous amino acids were found to be *Ch. vulgaris*, *S. bacillaris*, and, in the last place, *S. obliquus*, which proved to be the best source of threonine. The contents of exogenous amino acids have been compared with standard protein FAO.

Key words: mass algal culture, purification of wastes, algal protein, nutritional value.

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Andrzej PILARCZYK**Studies on intensification of carp farming. 9. State of health and haematological indices of carp in productive ponds.**

Acta Hydrobiol., 27, 229-239.

Abstract - To estimate the possible effects on the fish of experiments on intensive carp farming in ponds at Gołysz, ichthyopathological investigations were carried out in the productive ponds with the aim of evaluating the state of health of the fish. At all levels of intensification deviations from the norm of some indices and certain pathological changes were found. Nevertheless the results did not indicate any decidedly unfavourable effect of the intensification on the fish reared.

Key words: ponds, carp farming, production intensification, pathology, haematology.

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Marta RECZYŃSKA-DUTKA**Ecology of some waters in the forest-agricultural basin of the River Brynica near the Upper Silesian Industrial Region. 3. Chemical composition of the water. Heavy metals.**

Acta Hydrobiol., 27, 451-464.

Abstract - The level of heavy metals in the surface waters at the edge of the Upper Silesian Industrial Region exposed to emissions rich in Zn, Pb, and Cd did not differ much from that in relatively unpolluted waters, although increased concentrations of the above-mentioned metals were observed. Pollution in the River Brynica increased downstream to the dam reservoir, below which, except for Mn, the concentrations of metals decreased. The balance was negative only in the case of Mn, whereas a considerable portion of the load of the other metals transported into the reservoir with the river water remained in it. The effect of

metals on aquatic organisms is discussed.

Key words: rivers, dam reservoirs, lakes, ponds, heavy metals, water pollution, atmospheric pollution.

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Marta RECZYŃSKA-DUTKA

Ecology of some waters in the forest-agricultural basin of the River Brynica near the Upper Silesian Industrial Region. 4. Atmospheric heavy metal pollution of the bottom sediments of the reservoir at Kozłowa Góra.

Acta Hydrobiol., 27, 465-476.

Abstract - High contents of Zn, Pb, and Cd in the atmosphere of the Upper Silesian Industrial Region have led to the considerable and, in the course of time, increasing heavy metal pollution of the bottom sediments of the Kozłowa Góra reservoir situated in the vicinity. Apart from varied metal content in the different zones of the reservoir, their concentrations were as a rule higher in cold periods than in warm ones. Similarly as in dusts from Silesia, in the bottom sediments of the reservoir a narrow ratio of Zn:Pb (close to 2:1) was observed as well as lower content of Cd (by two orders of magnitude) with respect to both metals.

Key words: dam reservoir, heavy metals, pollution of bottom sediments, atmospheric pollution.

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Marta RECZYŃSKA-DUTKA

The effect of atmospheric pollution on the outflow and accumulation of heavy metals in the drainage basins of the Niepołomice Forest (Southern Poland).

Acta Hydrobiol., 27, 3-16.

Abstract - The high level of atmospheric pollution of the Niepołomice Forest led to a greater transport of certain metals from the forest watersheds with the stream waters. In spite of this, in comparison with the atmospheric loading of 1 km² of the forest the output of Pb, Cd, Cu, Ni, Zn, and Fe with the water was less than 33%. On the other hand, the export of Mn from both examined drainage basins was increased, being on the average 75% for the Traczówka stream and as much as 296% for the migne. The main run-off occurred during periods of raised water level and was a consequence of the washing-out of the metals by rain or their release from snow.

Key words: heavy metals, pollution, atmospheric input, output with stream water, accumulation.

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Mariusz RYBAK

The possibilities of using the SP-403/5 echosounder to investigate the thickness of lake bottom sediments.

Acta Hydrobiol., 27, 17-24.

Abstract - The usefulness of SP-403/5 echosounder for investigation of the thickness of lake bottom sediments was estimated. The investigation was carried out on Lake Kortowo. Two sections were made and

echograms with distinctly marked thickness of sediments were obtained. In order to confirm the credibility of the echograms as well as their proper analysis, several borings with a Douglas drill were made. The possibility of the appearance of untypical images in the echograms, which might hinder correct interpretation of the obtained results, was pointed out.

Key words: lakes, bottom sediments, hydroacoustic methods, echosounder, paleolimnology.

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The survival, growth, and morphological features of F₂ generation crucian carp hybrids reared in ponds in fish stock mixed with carp.

Acta Hydrobiol., 27, 101-111.

Abstract - The work concerns the survival and growth rate of crucian carp F₂ hybrids as compared with those of carp of the same age reared together in the same ponds. The analysis was also carried out of some plastic features and their variability in the two compared fish species living in the same environment conditions. Also included were indicators of head length, dorsal index and body thickness, and condition factors.

Key words: crucian carp hybrid, carp, rearing, survival, growth, morphology, variability.

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Ryszard SOWA

***Pseudocentropilum fascicaudale* n. sp. (Ephemeroptera, Baetidae) from Greece.**

Acta Hydrobiol., 27, 75-80.

Abstract - Winged forms (excepting the female subimago), nymph, and egg of the new species *Pseudocentropilum fascicaudale* n. sp. from the island of Rhodes are described and illustrated. They differ from the nominal species *P. motasi* Bogoescu (Bogoescu 1947, Keffermüller and Sowa 1984) above all in the form of the hind wing (females) and of gills (nymphs), and in the sculpture of the egg chorion. *P. fascicaudale* n. sp. differ also in the same characters from the related European species of *Centroptilum* Eaton *sensu lato*.

Key words: taxonomy, insects, mayflies, baetids.

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Aleksandra STARZECKA

Ecology of some waters in the forest-agricultural basin of the River Brynica near the Upper Silesian Industrial Region. 5. Bacteriological characteristics of the waters.

Acta Hydrobiol., 27, 477-492.

Abstract - The work concerns the bacteriological characteristics of some water bodies in Upper Silesia, i.e. the River Brynica, the dam reservoir at Kozłowa Góra, Lake Chechło-Nakło, and the wierklaniec park

pond. In the period May 1976 - May 1979 quantitative changes in heterotrophic bacteria, which carried out the conversion of nitrogen and sulphur compounds, were determined. The quality of the investigated waters was classified according to four purity classes which varied in the value of the biological and chemical indices of pollution, from class I, very pure waters, to class IV, very strongly polluted waters.

Key words: rivers, dam reservoirs, lakes, bacteria, water purity.

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Magdalena SZAROWSKA

Studies on intensification of carp farming. 6. Number and biomass of the main components of benthos.

Acta Hydrobiol., 27, 197-203.

Abstract - In the years 1971-73 investigations were carried out on the bottom fauna in ponds with environmental conditions differentiated by the application of various carp density, fertilization of ponds, and fish feeding. These factors were responsible for changes in the numbers and biomass of Chironomidae larvae, which were the dominating component of the bottom fauna. High stock density reduced their biomass in spring, whereas fertilization and the feeding of pellets stimulated an increase in number and biomass of the bottom fauna.

Key words: ponds, intensification of carp rearing, biomass and number of the macrobenthos.

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Jan SZUMIEC

Studies on intensification of carp farming. 1. Introduction and general programme.

Acta Hydrobiol., 27, 131-145.

Abstract - At the Fish Culture Experimental Station Gołysz investigations on intensification of table carp farming in ponds in the course of three cycles of experiments were carried out from 1969-1975. The principles, structure, and range of the studies are presented. They aimed mainly at learning the effectiveness of feeds of different stability and nutrient value as well as at defining the optimal stock density and rearing biotechniques, on the basis of observations of the influence of graded intensification of production and controlled eutrophication on the pond environment and the fish reared.

Key words: ponds, carp farming, intensification, principles, scheme and range of investigations.

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Jan SZUMIEC

Studies on intensification of carp farming. 10. Production results, environmental changes, and final considerations.

Acta Hydrobiol., 27, 241-277.

Abstract - Feeding carp on full value stabilized feeds renders fish production independent of pond fertility, allowing the introduction of high stock density and the achievement of a 4000 to 6000 kg yield of table carp per hectare. In ponds with an intensive level of production, despite their high eutrophication, the appropriate living conditions for fish are maintained, as well as the proper course of biochemical processes, when

modern rearing biotechniques are introduced. A dense fish stock accelerates the mineralization of organic matter and the turnover of biogenes.

Key words: ponds, carp farming, production intensification, environmental changes.

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Maria A. SZUMIEC and Jan SZUMIEC

Studies on intensification of carp farming. 2. Effect of temperature on carp growth .

Acta Hydrobiol., 27, 147-158.

Abstract - It was found that the influence of the water temperature effective for carp growth ($>14\text{ }^{\circ}\text{C}$) on the diel body mass rate takes an approximately linear form. On the basis of this relation and multiannual monitoring of the water temperature in ponds it was possible to determine the absolute and relative growth of the carp body mass during seasons of average and extreme thermal conditions, using different initial body mass and age. Application of high protein feed reduced the bottom threshold of temperature effective for carp growth to $13\text{ }^{\circ}\text{C}$.

Key words: ponds, intensification of carp production, carp growth rate, effective temperature for carp growth.

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Mirosława TKACZYK

Studies on intensification of carp farming. 7. Characteristics of carp nutrition.

Acta Hydrobiol., 27, 205-217.

Abstract - Investigations on the nutrition of two and three year old table carp in the conditions of differentiated intensive farming showed a greater filling of the alimentary canal when the fish were fed on wheat than when fed on more easily assimilated pellets. Faster assimilation of feed in a higher water temperature led to a smaller residue in the intestine during the summer months. In the alimentation of the artificially fed carp there dominated fodder whose proportion in the ration was increased during the season. The composition, share, and frequency of natural food were determined by the development of the natural resources and the pressure exerted on them by the fish.

Key words: ponds, carp farming, intensification, carp nutrition, food amount and composition.

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Wanda URBANIEC-BRÓZDA

Studies on intensification of carp farming. 4. Changes in abundance and diversity of phytoplankton.

Acta Hydrobiol., 27, 173-184.

Abstract - The results are presented of a 3-year investigation on the qualitative composition and changes in abundance of phytoplankton in five groups of ponds differing in the level of intensification of production. The intensification of production stimulated the occurrence of planktonic algae, especially of small green algae of the order Chlorococcales which, owing to their size, constituted accessible food for the zooplankton.

Key words: ponds, carp farming, intensification of production, phytoplankton, qualitative composition, changes in abundance.

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Wanda URBANIEC-BRÓZDA

Studies on intensification of carp farming. 5. Quantity and biomass of zooplankton.

Acta Hydrobiol., 27, 185-196.

Abstract - The results are presented of a 3-year study of zooplankton in ponds with various density of table carp stocks, depending upon the application of mineral fertilizers and feeds of different nutritional value. In spite of an increased pressure of dense fish populations on zooplankton, intensification of production led to an increased fertility of the ponds and, in consequence, stimulated the number and biomass of zooplankton animals (chiefly Rotatoria and *Bosmina* sp.). It was also found that, owing to the increasing fertility of ponds with a high intensity of production, there was a stronger development of zooplankton in the successive years of the investigation.

Key words: ponds, carp farming, intensification of production, number and biomass of zooplankton.

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The growth of the Danube salmon (*Hucho hucho* (L.)) (Salmonidae) introduced into the River Dunajec.

Acta Hydrobiol., 27, 113-125.

Abstract - The investigation was based on 133 specimens of Danube salmon. The growth rate and the value of the condition factor in the annual cycle were evaluated and the relation of the length and weight of fish was calculated. It was found that the growth of this species introduced into the River Dunajec in the River Vistula catchment basin was very rapid, frequently exceeding that observed in autochthonous populations of the Danube salmon in the catchment basin of the River Danube.

Key words: fish, Salmonidae, the Danube salmon, introduction, growth.

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Ecology of some waters in the forest-agricultural basin of the River Brynica near the Upper Silesian Industrial Region. 11. Ichthyofauna of the reservoir at Kozłowa Góra and Lake Chechło-Nakło .

Acta Hydrobiol., 27, 561-575.

Abstract - The development of ichthyofauna over more than 25 years in the potable water reservoir at Kozłowa Góra is described. Changes in the structure of the ichthyofauna are considered with those in the trophy of this reservoir. A short description of the ichthyofauna of Lake Chechło-Nakło is given. Practical conclusions were drawn for future management policy.

Key words: rivers, dam reservoirs, lakes, ichthyofauna, eutrophication, fisheries, percids, cyprinids.

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Jerzy ZIĘBA

Ecology of some waters in the forest-agricultural basin of the River Brynica near the Upper Silesian Industrial Region. 1. Range and aims of the investigation with a description of the environment.

Acta Hydrobiol., 27, 423-432.

Abstract - The paper gives the history of hydrobiological studies from the territory of the catchment basin of the River Brynica, the range and aims of complex team investigations undertaken recently in the river and water bodies being formulated. Some environmental problems in the conditions of industrial atmospheric and agricultural pollution are discussed. Descriptions of the environment of the sampling stations and of the methods applied are given.

Key words: rivers, dam reservoirs, lakes, ponds, environmental characteristics, pollution, eutrophication, biocenosis.

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Jerzy ZIĘBA

Ecology of some waters in the forest-agricultural basin of the River Brynica near the Upper Silesian Industrial Region. 10. Bottom insects with special regard to Chironomidae .

Acta Hydrobiol., 27, 547-560.

Abstract - In the River Brynica above the dam reservoir larvae of species living in pure or slightly polluted waters prevailed among bottom insects. In the dam reservoir at Kozłowa Góra the number of taxa, with the main share of Chironomidae, was distinctly lower than in the forest Lake Chechło-Nakło or in the wierklaniec park pond. With the inflow of mixed pollution and considerable ecological differentiation of stations benthic insects were not found to be distinctly threatened by pollution with heavy metals and run-off from agricultural areas. However, a further inflow of these compounds might markedly reduce the level of occurrence of such insects.

Key words: rivers, dam reservoirs, lakes, ponds, bottom insects, Chironomidae, pollution, heavy metals, eutrophication.

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Jerzy ZIĘBA

Ecology of some waters in the forest-agricultural basin of the River Brynica near the Upper Silesian Industrial Region. 12. Synthetic outline of investigation results and conclusions .

Acta Hydrobiol., 27, 577-587.

Abstract - The work presents the recapitulation of results of investigation series on the effect of industrial pollution on the waters of the forest-agricultural basin of the River Brynica. An accumulation of heavy

metals and an excess of organic matter in bottom sediments of the dam reservoir brought about a deterioration in the quality of this environment. The eutrophication influence of nutrients prevailed. The occurrence of various, numerous plant and animal organisms in the waters indicates their considerable potential for self-purification. In the River Brynica and in the stagnant waters of the basin no noxious effect of pollution with heavy metals from industrial dusts could be distinctly determined.

Key words: rivers, dam reservoirs, lakes, ponds, pollution, heavy metals, eutrophication.

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Roman ŻUREK

Species composition of zooplankton in surface waters near the Upper Silesia in the aspect of water quality.

Acta Hydrobiol., 27, 339-349.

Abstract - The qualitative composition of zooplankton was investigated in four rivers, a pond, a dam reservoir, and a flooded sand pit in the Upper Silesian Industrial Region. The occurrence of 26 Rotatoria taxons, 22 species of Cladocera, 11 species of Cyclopoida and Calanoida, and 1 species of Harpacticoida was noted. The qualitative composition of zooplankton of the dam reservoir at Kozłowa Góra and in the pond in the park at Wierklaniec suggest the eutrophication of these water bodies. The very poor composition of zooplankton in the Rivers Stoła and Graniczna Woda is caused by high concentrations of heavy metals, and in the River Mała Panew also by oxygen depletion.

Key words: zooplankton, heavy metals, toxicity, rivers, reservoirs, ponds.

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