



THE 17TH POLISH MALACOLOGICAL SEMINAR – WHAT DO WE DO?

SEMINAR REPORT

The previous (16th) Malacological Seminar was held in a place in the very north of Poland, on the Baltic Coast. This year we met in the very south of the country. The village of Ojców is located very close to Cracow. The village itself, with its few but very nice and rather loosely scattered houses, is beautiful and unlike any typical Polish village. It is situated in the midst of a karst area, in a limestone valley with many caves, rocks, interesting plants and – what more important – snails. The village lent its name to the Ojców National Park, small, but unique in many respects.

The Seminar started on May 30th and ended on June 1st – after two autumn seminars (15th and 16th) we have switched to the spring schedule again. The main organizer was Dr. hab. EWA STWORZEWICZ (to whom most of our thanks should go), aided by some of her colleagues from the Institute of Systematics and Evolution of Animals, Polish Academy of Sciences (Cracow) and some members of the Staff of the Ojców National Park.

Ojców is not a typical tourist place, that is to say people usually come there only to see the valley with its magnificent landscape, and then depart without staying for the night. It has one and not very big hotel



Fig. 1. Welcoming address by the Main Organizer
Dr. hab. EWA STWORZEWICZ

where some of us stayed. A few people stayed at the Field Station of the Academy, and most had to be content with private accommodation (as far as I know they were all very glad).

Participants were not very many, no doubt partly because of the fact that only a few months had passed since the previous Seminar (September 2000), and partly because the academic year was just coming to its end, and some people simply could not leave their respective universities.

On the first day we were welcomed by the main organizer, and by the Director of the Ojców National Park; then the Vice-Director told us about scientific studies in the Park, and Prof. ANDRZEJ SZEPTYCKI (entomologist, Institute of Systematics and Evolution of Animals, Polish Academy of Sciences) – about the Park's fauna, its origin and peculiarities.

There were about 40 of us, with 20 papers and about as many posters, in five oral plus one poster session, some very enthusiastic malacologists having as many as three papers/posters. Of three introductory lectures (first session) one (by Prof. ANDRZEJ FALNIOWSKI, Jagiellonian University) dealt with molecular methods in malacology, another (by the author of this report) with the evolution of land pulmonate life cycles, the third (by Dr. MARIANNA SOROKA, University of Szczecin) with speciation mechanisms from genetical viewpoint. The topics of papers and posters varied considerably (we are a mixed lot after all, and the only thing that truly unites us is THE MOLLUSC) – the problems discussed included genetics, host-parasite relations, physiology, ecology, dispersal, snail farming, fossil assemblages, molluscan pests etc., and even impressions of a malacologist who had taken part in a Pacific cruise (luckily the sailor-malacologist is also a very good photographer and could show us her wonderful slides). About half of the papers/posters dealt with aquatic malacology – a tendency observed also during some of the previous Seminars.



Fig. 2. During the General Assembly. From right to left: President of the Association – Dr. Adam Wojciechowski, author of this report – Dr. hab. Beata M. Pokryszko, Treasurer – Dr. hab. Andrzej Lesicki

It seems that we have something to brag about: quite many malacologists (and among these quite many young people), and a great variety of topics and approaches, with increasing quality of work (see also earlier seminar reports in *Folia Malacologica* and the Editorial in *Folia* 9(1)) and – though our Seminars are called Polish Seminars – we are getting really international, with guests from neighboring countries taking part in our meeting (see abstracts below).

Some of us go as far as writing malacological books from time to time. During the Seminar we could buy (at a favourable price) “*Drogi i bezdroża ewolucji mięczaków*” – a very interesting book about mollusc evolution by Prof. ANDRZEJ FALNIOWSKI.

The official sessions and papers, of which during the last 17 years we had many, are not the most important thing. In my opinion much more important is that we – most of us – have an opportunity to meet once a year, discuss out problems, start co-operation and help each other, during which process young people learn and old people become young again.

The General Assembly of the Association of Polish Malacologists decided that the next Seminar (18th,



Fig. 3. Listening to a lecture

spring 2002) would be organized by the University of Szczecin.

The official social events were two (unofficial events were many): grill & beer at a small restaurant and a long evening walk in one of the nearby valleys. There was no need to organize an excursion – just being in Ojców was enough.

As usual, brief abstracts of all the presentations included in the Abstract Book, are presented below. Only very few authors submitted really short texts, and some included even graphs and tables (the editors of the Abstract Book had a hell of a time to put the thing together, especially that some authors sent their texts the very last minute). As usual, the Abstract Book was in Polish. All the texts were translated and most quite drastically abbreviated, all this behind the authors' back, by Yours Truly.

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ABSTRACTS OF THE 17th POLISH MALACOLOGICAL SEMINAR, OJCÓW 2001

FAISUA, OSTRAS, CHOLGAS AND ALMEJAS –
NOT ONLY MALACOLOGICAL REFLECTIONS
FROM A PACIFIC CRUISE CHILE–NEW ZEALAND
ON A YACHT MARIA

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From April 2000 till January 2001 the author took part in the Pacific stage of a round-the-world expedition on a yacht Maria, owned by captain Ludomir Mącz-

ka. The route led from the Chilean Island of Chiloe, through Valdivia (Chile), Robinson Crusoe island and Polynesian islands: Marquesas, Samoa and Tonga, to New Zealand. All along the route of 9,000 sea miles the crew of three took samples of crustacean plankton from the depth of 50 m and conducted whole-day observations of sea birds. Physical parameters of air and surface layer of water were measured twice a day. Marine invertebrates such as corals, crustaceans and mollusc shells, were collected on volcanic and reef islands, focusing on species used by local people.



HOLOCENE MALACOFAUNA OF SMALL KARST FORMS OF THE OJCÓW PLATEAU

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Small karst forms are common in valleys in the vicinity of Cracow. They contain deposits abounding with mollusc assemblages. The studies included over 60 localities, 34 being analysed in detail. The deposits are usually up to 1 m thick. The assemblages include 64 land snail species of three main ecological groups (shade-loving, of open habitats and mesophilous). The following species reach the highest values of constancy and dominance: *Carychium tridentatum*, *Vallonia costata*, *Pyramidula rupestris*, *Alinda biplicata*, *Discus rotundatus* and *Chondrina clienta*. The malacofauna indicates a varied age of the deposits: assemblages characteristic of the Vistulian contain *Succinea oblonga*, *Pupilla muscorum*, *Semilimax kotulai* and *Clausilia dubia*. Early Holocene deposits harbour *Discus ruderratus*, *Acicula polita*, *Vallonia costata* and *Vitrea contracta*. Most assemblages correspond to climatic phases of the Meso- and Neoholocene. *Discus perspectivus*, found in two of the valleys, is indicative of climatic optimum. Three types of assemblages represent about half of the material. They are faunae typical of open and epilithic habitats, as well as faunae with a dominance of widely tolerant species. The former contain numerous *Chondrina clienta*, *Pyramidula rupestris*, *Vallonia costata* and *Truncatellina cylindrica*, the latter – *Carychium tridentatum*, *Vertigo pusilla*, *Vitrea contracta* and *Clausilia parvula*. Successions of assemblages in the deposits 0.6–1 m thick are very diverse, indicating only changes of local conditions.

SHIFTS OF TIMBERLINE IN THE TATRA MTS WITHIN HISTORICAL TIMES IN THE LIGHT OF MALACOLOGICAL ANALYSIS

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Deposits forming talus cones at the base of rock walls were analysed in detail. They are developed mainly in the western Tatra within Mesozoic carbonate formations; 11 such profiles were analysed, with deposits up to 1.5 m thick. The sites represent various vegetation zones (from lower forest zone to rock zone) and the variation of their mollusc assemblages reflects habitat changes. The whole material included 56 species of land snails (13,759 specimens), with the dominance of two ecological groups: one including forest and shade-loving species, the other with epilithic and meadow forms. The proportion of the two components varies within the profiles, thus offering a possibility of interpretation of shifts of the timberline. Due to this cooler and warmer phases could

be distinguished within the last 700 years: the first warm phase – mediaeval climatic optimum (14th – 17th c.); the first cool phase (14th/15th c.); – a warming including 18th/19th c.; – a cooling in the second half of the 19th c.; – a warm phase of the 20th c.

SNAILS OF THE FORMER IRONWORKS AREA OF THE STAROPOLSKI INDUSTRIAL REGION IN THE ŚWIĘTOKRZYSKIE MTS

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The development of iron production in the Świętokrzyski region during Roman times started a deforestation of considerable areas in the Świętokrzyskie Mts; the intensity of mining was the highest in the 18th–19th c. The regeneration of natural environment still continues. Malacofauna of seven localities in the former ironworks area in Starachowice was studied in order to estimate succession. A total of 44 species of land snails were recorded; *Bradybaena fruticum*, *Laciniaria plicata*, *Cochlicopa lubrica* and *Discus rotundatus* dominated in Starachowice; *Laciniaria plicata* in Samsonowo; *Helicella obvia* and *Vallonia pulchella* in Machory. Dominance structure has been developed only in three sites associated with storage of calcareous rock. The succession is slow and associated with ruins and use of calcareous stone.

DREISSENA POLYMORPHA (PALL.) ON VARIOUS SPECIES OF MACROPHYTES IN THE LAKE HAŃCZA

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Dreissena polymorpha is the dominant macroinvertebrate in the lake Hańcza. The aim of our studies was to determine significance of various species of macrophytes as substratum for the zebra mussel. Hańcza is the deepest lake of the Central European Lowland, of low trophy, with dominance of litholittoral and poorly developed reed communities; submerged vegetation includes mainly three species of *Chara*; *Potamogeton perfoliatus*, *Elodea canadensis*, and other species of submerged macrophytes are scarce. *D. polymorpha* was found to use various plant species to different degree; its frequency on *Phragmites*, *Potamogeton* and *Elodea* was 50–60%, on *Chara* 100%. Its density and size structure also varied with plant species, site and depth. On *Phragmites* and *Potamogeton* the mussel was sparse, individuals of 8–16 mm dominating and young mussels being sporadic; the density and size structure on *Elodea* were found to depend on depth. Depending on species of *Chara*, the highest density was reached by

mussels of different size classes; the size structure indicates that postveligers settle mainly in deeper parts of littoral (from 3 m downwards), migrating shorewards in autumn and winter. On macrophytes the zebra mussel does not reach the maximum size of the bivalve noted on other substrata in the lake (29 mm).

MALACOFAUNA OF HOLOCENE LACUSTRINE DEPOSITS IN WIERZCHY (NE POLAND)

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The maximum thickness of the studied deposits – mainly calcareous gyttja and lacustrine chalk – is 11 m. Molluscs were found in 27 samples; 16 species included 2 terrestrial snails, 8 aquatic snails and 5 bivalves. The terrestrial snails (*Succinea putris* and *S. elegans*) are hygrophilous. Two types of association were distinguished: one including assemblages with over 80% *Valvata piscinalis* and *Pisidium nitidum*, another with richer assemblages with a considerable proportion of *Bithynia tentaculata*, *Valvata cristata* and *Armiger crista*. The succession of mollusc assemblages indicates the evolution of the lake: in lower strata species associated with permanent water bodies and flowing waters (*Valvata piscinalis*, *Pisidium nitidum*) dominate; higher up the assemblages get poorer, with single mollusc shells and fish scales indicating an open water body with poor organic life; later still the assemblages become richer, with an increasing proportion of species of shallow and vegetation-overgrowing habitats, thus indicating a gradual disappearance of the lake (appearance of terrestrial species). *Bithynia*-index assumes positive values characteristic of zones overgrown with rush and reed.

CONTENT OF HIGH-ENERGY PURINE NUCLEOTIDES IN MUSCLES OF FLUORIDE-EXPOSED *HELIX ASPERSA MAXIMA* AS AN INDICATOR OF ENERGY METABOLISM

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Exposure to fluorine compounds limits ATP synthesis and may thus affect energy metabolism. Purine derivatives were determined with HPLC liquid chromatography, fluorides – with gas chromatography. Muscle tissue of the foot served as material. The snails received feed supplemented with NaF at doses of 133, 665 and 1,330 ppm. Thirteen purin derivatives were determined; fluoride concentration had a statistically significant effect on the content of GMP, ATP, ADP, Xan, NAD, Guo, and EC value. A correlation was

found between the fluoride dose and increased concentration of GMP, ADP, Urd, NAD, and decreased concentration of ATP, Xan, Guo and EC value. Above a certain threshold fluoride concentration the observed tendencies became reversed: the highest fluoride concentration (1,330 ppm) resulted in a decrease of GMP and Urd while ATP, Xan, Guo and EC increased.

CHANGES IN THE ACTIVITY OF GLUCOSE-6-PHOSPHATASE IN TISSUES OF *HELIX ASPERSA* (O. F. MÜLLER) ACCLIMATED AT 5°C AND 25°C

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Glucose-6-phosphatase (G6Pase) [EC 3.1.3.9] hydrolyses glucose-6-phosphate to glucose and inorganic phosphate. Its activity was detected in many vertebrate tissues. G6Pase is a membrane enzyme whose functioning depends on the presence of five proteins of different, complementary functions. The mechanism of its action is not known in detail. G6Pase is one of the key enzymes of gluconeogenesis. In gastropods, like in vertebrates, G6Pase is located in the microsomal fraction of hepatopancreas. The aim of our studies was to check if acclimation at 5°C and 25°C affects the activity of G6Pase in tissues of *Helix aspersa*. Sixty seven adult specimens (mean body weight 20.9 g) from the culture of the Institute of Animal Husbandry, Balice near Cracow, were fed with standard feed and kept in plastic boxes at 25°C; during the experiment, snails acclimated at 5°C during 10 days were not fed. G6Pase activity in the hepatopancreas and kidney was determined colorimetrically according to Toshima & Yoshimura. In the spring the activity of G6Pase in the snails acclimated at 5°C increased statistically significantly compared to the snails kept at 25°C (hepatopancreas 3.83 versus 22.22 U/g tissue, kidney 0.81 versus 0.60 U/g tissue); in the autumn the activity showed no significant changes. The increased activity of the enzyme in the spring indicates an intensified gluconeogenesis.

MOLECULAR MALACOCYTOLOGY – TRACING EVOLUTION FROM DEMA TO SUPERFAMILY

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Molecular data, especially allozyme electrophoresis and DNA sequencing, offer an insight into micro- and macroevolutionary processes. Such information often proves more useful than traditionally applied morphological characters. For over 10 years the Labo-



ratory of Malacology, Jagiellonian University, has been conducting molecular studies of this kind. Many land snails, especially Helicoidea, display a polymorphism of shell, of soft parts colour and pattern, and also of allozymes. Such a polymorphism was studied in *Bradybaena fruticum*, indicating differentiation between populations, association between colour morphs and external factors of genetic background. Genetic markers make it possible to estimate gene flow between populations. An extremely low gene flow and interpopulation differentiation in accordance with the archipelago model was found for *Chondrina clienta*; a similarly low gene flow, following the stepping stone model, was found in *Bythinella*, while the same model with a higher gene flow was detected in *Melanopsis*. Knowledge of breeding systems is crucial for studies on microevolutionary processes. In aquatic and terrestrial snail populations inbred is not as frequent as usually believed. On the other hand, the genetic structure of *Chondrina clienta* confirms self-fertilisation, and also a strong effect of genetic drift in populations of extremely low evolutionary effective size. In *Valvata piscinalis* (Heterostropha) the genetic structure precludes frequent selfing. Allozyme electrophoresis makes it possible to detect hybrids: such a hybrid (fertile female) was found between *Viviparus contectus* and *V. viviparus*. Molecular methods are used in studies on speciation or to decide if two taxa are already species. Allozymic studies on four species of *Melanopsis* from Israel revealed that three of them were distinct (species and subspecies) while the fourth was ancestor of the remaining two (one with two subspecies). Specific status of *Adriohydrobia* from Croatia has not been confirmed; the differences in shell size and proportions were not compatible with mtDNA differences; probably all the described species represent *Adriohydrobia gagatinella*. The populations are young, of star phylogeny structure. Neither the distance of over 1,000 km nor the barrier constituted by the Alps caused species distinctness of N Italian *Marstoniopsis insubrica* and *M. scholtzi* widely distributed in N Europe. Molecular methods are also useful in tracing macroevolution. Such studies (allozymes) revealed only a distant relationship between *Viviparus contectus* and *V. viviparus*. When reconstructing the phylogeny of *Viviparus*, a hypothesis was proposed of sympatric speciation at the glacier front. Allozymes, however, allow only a reconstruction of relationships between not very remote taxa that share at least some allozymes. To reconstruct the so called deep phylogeny it is necessary to apply DNA (both nuclear and mitochondrial) sequences. In this way relationships between 40 taxa of the Hydrobiidae s. lat. and related taxa were analysed; the Hydrobiidae proved to be polyphyletic.

PRELIMINARY STUDIES ON THE EFFECT OF INFECTION WITH LARVAE OF *ALARIA ALATA* (GOEZE, 1782) ON POPULATION DYNAMICS OF HOST SNAILS

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Life cycle of *Alaria alata* (Digenea: Strigeida) includes two obligatory intermediate hosts: snails (*Planorbis planorbis* or *Anisus vortex*) and frogs and tadpoles (*Rana temporaria* or *R. esculenta*), ultimate hosts (dogs) and parathenic hosts (wild boar). The snails are “producers” of furcocercariae. The extensity of infection and mortality of the snails were found to vary. In summer 2000 the number of dead snails was high, the remaining individuals being not infected; in autumn 2000 the mortality was also high, the live snails being infected to a low degree with *Notocotylus tenuatus*. The reason for the high mortality was probably the autumn invasion of *Alaria alata* (furcocercariae penetrating through body covers). It is likely that the infected snails are also less tolerant to changing environment conditions.

MOLLUSCS OF THE RIVER MUCHAWKA AND SELECTED HABITAT FACTORS

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Muchawka is a small river crossing Wysoczyzna Siedlecka, tributary to the Liwiec river. Qualitative and quantitative studies were conducted in 1999 and 2000, according to the phenological cycle. Selected physico-chemical parameters were measured (temperature, pH, electrolytic conductivity, BZT5, concentration of dissolved oxygen, concentration of nitrate nitrogen, phosphates, chlorides, total hardness). Twelve mollusc taxa were recorded, the dominants being bivalves of the genera *Sphaerium* and *Pisidium* and snails of the genus *Lymnaea*, mainly *L. stagnalis* (L.). Compared with the results of studies on the same river of 1994–1995, the number of taxa has not changed.

STRUCTURE AND RICHNESS OF
MALACOCENOSES IN HABITATS POPULATED
TO VARIOUS DEGREE BY *DREISSENA*
POLYMORPHA (PALL.) – SULEJOWSKI
RESERVOIR, C POLAND

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Molluscs were collected in July of 1999 and 2000 from 21 sites. Twenty one species – 9 snails and 12 bivalves – were found, as well as shells of another three planorbid species. The number of species per site ranged from 0 to 12. The zone remote from the main current and the shallows harboured more species (17) than habitats closer to the current (11). The most common and constant were *D. polymorpha*, *Valvata piscinalis* and *Pisidium henslowanum*. The mean proportion of *D. polymorpha* was 57.3%, the proportion was higher farther from the current (ca. 70%) than close to the former bed of Pilica (c. 21%). *D. polymorpha* was found in the whole reservoir, the density however being negligible (1.2%) in its upper part. The mollusc density ranged from 0 to 1,728 indiv./m², the biomass from 0 to 497 g dry weight/m². The density of *D. polymorpha* affected the occurrence of most other mollusc species. In sites where it was absent or its density low (0–200 indiv./m²), the number and density of other species were decidedly higher than in those where its density exceeded 500 indiv./m²; the dominance structure was also different.

PALATABILITY OF VARIOUS SEGETAL WEED
SPECIES TO PEST SLUGS

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The aim of the studies was to establish food preferences of two slug species: *Arion lusitanicus* Mab. and *Deroceras reticulatum* (O. F. Müll.) towards various common weed species. The preferences were studied in the laboratory, day temperature 19°C, night temperature 16°C, RH 95% and daylight of 15 hrs. For each slug species 19 weed species and winter rape were tested in various combinations. In the first days of feeding *A. lusitanicus* clearly preferred *Conium maculatum* L.; *Euphorbia pelbus* L. and *Polygonum nodosum* Pers. were the least palatable. *D. reticulatum* preferred winter rape (*Brassica napus* var. *biennis* (Schübler et Mart) Rchb.), followed by *Lamium purpureum* L. *P. nodosum* was consumed to a small degree and *Chelidonium majus* L. was not accepted.

MOLLUSCS OF THE WARTA RIVER OXBOWS

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Samples were taken in 1998–1999 from April till September in 7 sites in 3 oxbows; the sites differed in the quality of their bottom deposits and vascular vegetation. Seventeen mollusc species were recorded: 14 snails and 3 bivalves. Six snail species were common and abundant: *Anisus vortex* (L.), *Planorbis planorbis* (L.), *Planorbarius corneus* (L.), *Bathymphalus contortus* (L.), *Radix peregra* (O.F. Müll.) and *Bithynia tentaculata* (L.). They occurred mainly among aquatic vegetation and on sandy-muddy and muddy bottom. Common but less abundant were: *Physa fontinalis* (L.), *Viviparus contectus* (Mill.), *Lymnaea stagnalis* (L.) and *Segmentina nitida* (O.F. Müll.), the remaining species being accessory and found at single sites. The fauna is qualitatively similar to that of the river; species resistant to desiccation and water level fluctuations dominated in the oxbows; the bottom deposits, depth, water level fluctuations and physico-chemical properties of water affect the diversity of vascular vegetation which in turn influences the diversity of aquatic fauna.

MORPHOLOGICAL VARIABILITY OF *ANODONTA*
WOODIANA WOODIANA (LEA, 1834) IN THE
INITIAL COOLING RESERVOIR OF THE POWER
PLANT KONIN

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The initial cooling reservoir is a part of the Konin water system: 75 ha in area, c. 1.8 mln m³ in volume, of maximum depth of 4.2 m, mean depth 2.5 m, it is divided in two parts by a stone transept (former road); the water exchange takes place every 3–4 days. The flow is considerable only in the discharge zone (0.15 m/s), temperature difference between the discharge and outlet zone is 6°C, the summer temperature ranging from 26 to 32°C. The bottom deposits at the transept are organic-rich. In the discharge zone the density and biomass were higher (30 indiv./m² and 10.240 g/m²) than in the other zones (10 indiv./m² and 880 g/m²). The population consisted of individuals aged 3–5 years, those from the mid and outlet part of the reservoir being smaller (3+ 74 mm, 4+ 95 mm, 5+ 110 mm) than those from the discharge zone (3+ 108 mm, 4+ 140 mm, 5+ 155 mm). The specimens from the region of transept had a lower height and width (S/L = 0.33, S/H = 0.58), compared to those from the mid and outlet zones (S/L = 0.38, S/H = 0.65). Their shells were dark brown, those of speci-



mens from the remaining zones – lighter, honey brown.

MARINE MALACOFAUNA FROM VISTULIAN DEPOSITS OF THE LOWER VISTULA RIVER

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The exposure Gniewskie Młyny, located on the edge of the Wierzyca valley, contains a series of sandy-gravelly deposits over 30 m thick. Samples were taken from a profile of 29 m. The fauna is fairly well preserved: most shells are bivalve shells, mostly with damaged hinges and traces of transport; snail shells are fewer but better preserved. Two snail and nine bivalve species were identified, the most numerous being *Cerastoderma glaucum* Poiret, *Nassarius reticulatus* (L.), *Dosinia lincta* (Pulteney). Less frequent were *Macoma baltica* (L.), *Acanthocardia echinata* (L.), *Spisula subtruncata* (Da Costa), *Corbula gibba* (Olivi), *Bithium reticulatum* (Da Costa), while *Ostrea edulis* (L.), *Abra nitida* (O.F. Müll.), *Divaricella* sp. and *Cuspidaria* sp. were sporadic. A part of the material was dated with uranium-thorium method, with the following results: *Nassarius reticulatus* 15.3–31.4, *Cerastoderma glaucum* 64–138, unidentified fragments 43–93 thousand years BP. The age corresponds to the Vistulian, starting with the Eemian till the end of Grudziądz interstadial episode. The dates correlate well with radiocarbon dating. The presence of *Nassarius reticulatus* and *Cerastoderma glaucum* speaks against the Eemian age; the dates suggest the Grudziądz interstadial.

CHARACTERISTICS OF A POPULATION OF *DREISSENA POLYMORPHA* (PALL.) FROM A EUTROPHIC LAKE IN THE MASURIAN LAKELAND

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The studies were carried out in a eutrophic lake Inulec, a part of the lake system connected by the river Jorka. Abundance dynamics of planktonic larvae and variability in their horizontal and vertical distribution were studied on the background of distribution of adult *D. polymorpha*. Besides places with constant density of larvae, there were sites with abundance varying much with the season, as well as sites devoid of larvae. The highest density of larvae was noted above beds of reproducing *D. polymorpha*. Wind

has a distinct effect on the vertical distribution of larvae: in windless weather they stay in shallower layers; wind causes even distribution of larvae in the whole water column or their increased abundance in deeper layers. Settling of veligers was the most intense in the eastern part of the lake (wind-exposed, with prevailing westerly winds). Differences in abundance of planktonic larvae in consecutive seasons were reflected in the age structure of sedentary individuals.

THE EFFECT OF ECOLOGICAL CONDITIONS ON THE OCCURRENCE OF SNAILS IN WATER BODIES OF WYSOCZYNA CIECHANOWSKA

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The studies included snail communities of rivers, streams, oxbows and anthropogenic reservoirs (clay pits) of Wysoczyzna Ciechanowska. The following parameters were used when characterizing the malacocenoses: dominance (D), constancy (C), commonality (Q), Simpson's and Shannon-Wiener's diversity indices and equitability index. The malacocenoses were subject to cluster analysis. The most abundant, frequent and common species in rivers was *Bithynia tentaculata* (L.), the highest density of gastropods being 804 indiv./m² (Łydynia river) on a sandy-stony bottom. Malacocenoses of the rivers Łydynia and Pelta were the most similar, *Valvata piscinalis* (O.F. Müll.) being the most abundant in both. Another cluster was formed by the river Wkra and its oxbows, *Viviparus viviparus* (L.) being the most abundant and common. The malacocenoses are affected by the type of water body, substratum, physico-chemical properties of water, and presence of macrophytes.

THE EFFECT OF ACCLIMATION ON THE ACTIVITY OF FRUCTOSE-1,6-BISPHOSPHATASE IN SELECTED TISSUES OF *HELIX ASPERSA* (O. F. MÜLL.)

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Fructose-1,6-bisphosphatase (FBPase) [E.C. 3.1.3.11] hydrolyses fructose-1,6-bisphosphate to fructose-6-phosphate and inorganic phosphate. It is a key enzyme of gluconeogenesis. Our earlier studies showed that FBPase activity in *Helix pomatia* L. and *Pomacea bridgesi* (Reeve) was the highest in hepatopancreas, and 3–4 times lower in kidney and foot muscle. This study was aimed at establishing if low temperature induced increase in gluconeogenesis in selected tissues of *H. aspersa*. Snails from the cul-

ture of the Institute of Animal Husbandry, Balice near Cracow, were acclimated during 10 days at 25°C and 5°C. The experiment was carried out in April/May and November/December. FBPase activity in hepatopancreas, kidney and foot muscle was determined according to Toshima & Yoshimura (inorganic phosphate) and Bradford (proteins). In spring the activity of FBPase increased in hepatopancreas of snails acclimated at 5°C compared to those kept at 25°C, the respective mean activities being 4.99 and 2.60 U/g tissue. A similar effect was observed in foot muscle. In autumn no difference was observed between both groups of snails. The values in kidney did not differ between the groups in spring or autumn. The spring increase in the FBPase activity indicates an intensified gluconeogenesis.

PRELIMINARY RESULTS OF FARMING *HELIX POMATIA* L.

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Eggs and snails aged from 0+ to 1+ collected in the field served as material; they were kept in enclosures in greenhouses and in plastic containers indoors. They were fed with feed used for *Helix aspersa*. Observations on reproduction, growth rate and mortality were conducted in both laboratory and natural population. Till the age of 4 months the fastest growth was observed in the containers while greenhouse snails did not differ from natural population. Greenhouse snails aged 1+ had their body mass by 30% higher than the remaining two groups. When aged 2+ the hothouse snails displayed a growth rate by 25% higher than snails from natural population of corresponding age.

SEASONAL CHANGES IN THE LEVEL OF CRYOPROTECTIVE SUBSTANCES AND TEMPERATURE PREFERENCES IN THE ROMAN SNAIL

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Forming epiphragm by the Roman snail prior to winter torpor may suggest endogenous regulation of the process. For this reason we decided to check if its temperature preferences and glycerol level in the haemolymph changed seasonally. The material consisted of adult individuals collected in the field. Diurnal and seasonal temperature preferences were examined in a chamber with linear thermal gradient, in spring, summer, autumn and winter. Glycerol level in

the haemolymph was determined in each experimental group. Differences were observed in temperature preferences between spring and summer (c. 23, 27 and 28°C for spring, summer and autumn, respectively). Latency of coming out of torpor was in reverse proportion to temperature. Glycerol level changed statistically significantly between seasons, being the highest in April (c. 0.219 mmol/l) and the lowest in October (c. 0.034 mmol/l). The results of behavioural studies suggest that the snail winter torpor is a passive reaction to winter cold.

INVASION OF A NEW ZALAND SNAIL *POTAMOPYRGUS ANTIPODARUM* (GRAY, 1843) IN THE LAKES OF BORY Tucholskie

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The studies included 27 lakes in the region of Chojnice, Czersko and Raciąż. *P. antipodarum* was present in 21 of them, at densities from 10 to 29,870 indiv./m². Strongly eutrophic, dystrophic, Lobelia lakes and lakes isolated from main water courses were free from *Potamopyrgus*. Including *Potamopyrgus*, shallow littoral harboured 38 species of molluscs; the frequency of *Potamopyrgus* in quantitative samples exceeded 90%. The most frequent accompanying species were: *Pisidium henslowanum*, *Gyraulus albus*, *Pisidium supinum*, *P. casertanum*, *P. subtruncatum*, *P. moitessierianum*, *Valvata piscinalis* f. *antiqua* and *Pisidium amnicum*. The population density of *P. antipodarum* was found to affect the number of mollusc species: in the lake Śpiewnik where the density of *Potamopyrgus* was 25,000 indiv./m² there were only 3 other mollusc species in a sample of 1 m², while in the lake Śluza (density of *Potamopyrgus* 100 indiv./m²) on a corresponding surface 11 mollusc species occurred. The density of *Potamopyrgus* affects also other mollusc species, resulting in a decrease in their density. The phenomenon pertains mainly to molluscs using the same food resources as *P. antipodarum*. The vertical range of *P. antipodarum* was studied in the lake Ostrowite where it occurred at 2.5–10 m, with a maximum density at 2.5 m.

EVOLUTION OF LIFE CYCLES OF LAND PULMONATES

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Depending on the classification system, land pulmonates are included in 60–70 families. Life cycle data exist only for members of ca. 25 of them, pertaining mostly to single species and often only one or a few aspects of life cycle. The high diversity of life cy-

cles within families or genera, questionable monophyly of many supraspecific taxa and variety of evolutionary tendencies result in the data at our disposal being very scarce and difficult to interpret. Nonetheless, they allow a preliminary estimate of evolutionary tendencies of life cycles, interrelationships between some of their parameters and revealing numerous instances of parallel evolution as well as indicating the most necessary directions of studies. Many life cycle characters are correlated with each other in such a way that a change in one triggers changes in others, or with morphological characters or habitat conditions. Life span is correlated with adult size, sluggishness and shell thickness; ovoviviparity – with small adult size and lack of other possibilities of parental care and climate; egg protection – with adult size; uniparental reproduction – partly with aphyllism and adult size, partly with phylogenetic position; growth continuation by sexually mature individuals – with shell structure, phylogenetic position, life span and duration of reproductive life; growth rate prior to maturity – with adult size (thus life span); mode of copulation (mutual versus non-mutual) – with phylogenetic position; duration of reproductive season – with climate, adult size and life span; calcium provision of eggs – with phylogenetic position, egg size and adult size (thus life span) and shell structure; cannibalism – with biparental reproduction, egg calcification, multiple copulation with different partners and asynchronous hatching; spermatophore formation – with climate and phylogenetic position; complication of mating behaviour – with phylogenetic position. Basic characters of the life cycle of hypothetical common ancestor probably included: life span not much exceeding one year, no growth continuation by sexually mature individuals, simple mating behaviour, only one reproductive season depending solely on external conditions, possibility of uniparental reproduction, non-mutual copulation, lack of spermatophores, strict oviparity, no egg protection, eggs uncalcified. The evolution of life cycle, varying between phylogenetic lineages, consisted in modification of its various parameters. The tendencies that can be distinguished: extending life span and reproductive life, growth continuation following sexual maturity, reproductive season limited to a short period in a year, improving egg protection (including ovoviviparity and egg retention) and calcium provision, mutual copulation, loss of ability to reproduce uniparentally, complication of mating behaviour and spermatophore structure, sometimes resulted in a parallel appearance of similar solutions in remotely related taxa (e.g. ovoviviparity, calcification of eggs, prolonged growth). The most urgent studies on life cycles of land pulmonates should be aimed first of all at establishing complete life cycles of members of neglected and/or phylogenetically crucial taxa, recognition of variability of life cycle parameters within monophyletic families and genera. Such stud-

ies should be preceded by compiling a list of life cycle parameters essential from evolutionary viewpoint (life span, growth rate prior to and after reaching sexual maturity, duration of reproductive life, mating behaviour and mutual/non-mutual character of copulation, protandry versus simultaneous hermaphroditism, spermatophore structure, presence/absence and character of uniparental reproduction, number of eggs per clutch and per lifetime, absolute and relative egg size, calcium provision of eggs, presence/absence of ovoviviparity or egg retention, parental care, incubation period, cannibalism, reproductive season). Such data would allow for confirmation of the supposed mutual correlation between the life cycle traits and perhaps also their correlation with evolutionary success in terms of the number of species and distribution range.

DIVERSITY OF SHELL PATTERN PHENOTYPES IN *DREISSENA POLYMORPHA* (PALL.)

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Shells of *Dreissena polymorpha* are variously coloured, with a more or less expressed pattern, or unpatterned, so that a gradation of melanisation can be distinguished, from unpatterned light (N2) to unpatterned dark (D2), with a 1/6 increase of melanisation with each grade of the scale. The degree of melanisation is estimated by Km index which assumes values from 0 to 1. The values varied between sites: from 0.341 (lake Volvi, Greece), 0.412 (lake Sasyk, Ukraine) to 0.604 (lake Ontario, Canada) or 0.832 (Kanew reservoir, Ukraine); in the Konin lakes in Poland the range was 0.572 to 0.630. The shell pattern is formed by several phenes; three basic elements predominate: arc (G), wave (J) and ray (K) whose frequency varies with habitat and locality. High J and K frequencies are characteristic of European populations while phene G prevails in the American Great Lakes. The ratio J/G varied from 0.434 to 0.691 between North American populations; in European populations two groups could be distinguished: northern with average J/G ratio of 2.447 and southern, with the ratio of 0.520. In the Konin lakes several subpopulation groups exist with different frequencies of phenotypes.

ON PLEUROTOMARIOIDEA AND MY CONTACTS WITH THEM (FROM MEMORIES OF THE CURATOR OF THE WARSAW MOLLUSC COLLECTION)

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Pleurotomarioidea are the oldest and the most ancestral group of snails with extant representatives. In the past, starting with the Cambrian (ca. 800–900 mln years bp) they were extremely diverse and abundantly represented, with over 500 fossil species described. Discovery of an extant *Pleurotomaria* at half of the 19th c. was a sensation; on the turn of the 19th c. the still very rare specimens were called “Milionärschnecken”. Extant pleurotomarias live at great depths of (100?)200–2000(3000?) m. Only as late as during the last 30–40 years, with development of deep-sea fishing, they ceased to be a rarity in malacological collections. Today about a dozen of extant species are known, placed in three genera. My personal interest in pleurotomarias since nearly 50 years has recently resulted in acquiring 3 specimens (of 3 species) for the Warsaw malacological collection.

SIZE STRUCTURE AND DISTRIBUTION OF POSTVELIGERS OF *DREISSENA POLYMORPHA* (PALL.) IN THE HEATED KONIN LAKES

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In the Konin lakes *Dreissena polymorpha* inhabits various substrata, kinds of water bodies and temperatures. Its summer reproduction peaks differ from those observed in other waters. The size structure and distribution of postveligers were analysed with respect to the influence of temperature and water dynamics. Three size classes were distinguished: L1 – 0.3 mm, L2 – 0.6 mm and L3 – 0.8 mm, and four types of dominance: I – with the dominance of L1, II – with the dominance of L2 and subdominance of L1, III – with the dominance of L2 and subdominance of L3, IV – with the dominance of L3 and subdominance of L2. The types differ in the mean individual body mass. The mean abundance of postveligers in the canals was over twice higher than in the lakes. The factors determining settling of postveligers were water flow and temperature; substrata encountered by postveligers carried with the flow resulted in their abundant settling. The biomass of postveligers settled on shells of *Anodonta woodiana*, compared to stony substrata in

lotic zones and lakes, was four and two times lower, respectively.

GENETIC APPROACH TO SPECIATION PROCESS

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Reproductive isolation, effected by various mechanisms, is of crucial importance in the process of speciation. Genetic changes that take place during speciation can be expressed qualitatively and quantitatively, using coefficients of genetic similarity (I) and genetic distance (D), the values of these parameters at particular stages of evolution being similar between taxa. Genetic differentiation between species arising through quantum speciation is different – I and D between such species assume values characteristic of local populations. Determining genetic distance is helpful when classifying taxa, describing genetic changes in populations and analysing phylogeny. For example, genetic similarity in *Dreissena polymorpha* and *D. bugensis* at interpopulation and specific level is similar to that found in most other species. A form of *Dreissena* called “quagga” and found in the American Great Lakes was identified as *D. bugensis* based on a very low genetic distance.

COLONIES OF *DREISSENA POLYMORPHA* (PALL.) – THEIR SIGNIFICANCE FOR LITTORAL POPULATIONS AND BIOCENOSSES

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Colonies are the basic component units of a *Dreissena* bed. They arise on various substrata – live (plants, animals) or dead, permanent and ephemeral, of different shape and structure. The number of specimens in the colony varies widely, reaching several hundred or more. The colony is formed of individuals of various age. Younger mussels grow on older ones forming multi-layered aggregations with living conditions deteriorating with age and size of the mussels. One of the effects of overgrowing is an increased mortality rate and slower biomass production. Our data suggest that the multi-layered growth of the colony is an important component of the optimum strategy of energy resources management. Colonies of *Dreissena* in the littoral provide numerous microhabitats modifying living conditions of other organisms (algae, invertebrates, fish).



CHANGES IN THE SNAIL FAUNA OF THE DAM RESERVOIR IN PRZECZYCE IN 1980–1997

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Dam reservoirs provide specific microhabitats for benthic fauna, the highest diversity being observed between the 4th and 7th year of the reservoir's existence. The studies in the reservoir in Przeczyce in 1980, 1988 and 1996 made it possible to estimate the effect of hydrotechnical manipulations on the diversity of gastropods and the diversity-determining factors. Material was collected from 10 sites using standard hydrobiological methods. Only five species out of 15 (*Lymnaea stagnalis*, *Radix peregra*, *Planorbis planorbis*, *Gyraulus albus* and *Planorbarius corneus*) were constant components of the fauna during the whole study period. Their dominance structure changed, this being the most pronounced in the case of *Radix peregra* and *Gyraulus albus*. Besides species that were present throughout the study period, characteristic species of shallow, eutrophic water, of various resistance to drying out, were recorded: *Bathyomphalus contortus*, *Anisus vortex*, *A. spirorbis*. In 1996, during reconstruction of the reservoir, two species characteristic of shallow, temporal water bodies appeared: *Stagnicola palustris* and *Galba truncatula*. It seems that the low temperature is not the factor limiting gastropod occurrence. Quality of bottom deposits, vegetation and fluctuations of water level seem to determine snail occurrence.

WHAT DETERMINES THE DENSITY OF FOREST MALACOCENOSES OF THE BIESZCZADY MTS?

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The material came from 11 forest localities typical of the western Bieszczady Mts (beech, sycamore and alder forests) within 650–1,250 m a.s.l. 550 samples of litter and soil were taken with a square frame 20x20 cm. The gastropod density ranged from 18 to 1,341 indiv./m², in a beech forest with *Allium ursinum* and alder swamp, respectively. The sites were characterized with respect to their topography, soil conditions and vegetation. Multiple regression method revealed the following variables as the most important: altitude, slope, compactness of shrub layer, density of herb layer, pH, organic matter content, salinity. In various areas different factors may determine gastropod abundance, and thus the model cannot be carelessly extrapolated to other areas.

INTRODUCTION AND POLYMORPHISM OF *CEPAEA HORTENSIS* (O. F. MÜLL.) IN LVOV

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Of three species of *Cepaea* living in Lvov only *C. vindobonensis* is native. *C. hortensis* and *C. nemoralis* were introduced in the city in the 20th c., probably with plants. *C. hortensis* occurs abundantly in a variety of habitats, *C. nemoralis* is sparse in one of the parks. The accidental introduction of *C. hortensis* in Lvov resulted in a decreased variability of the population compared to natural populations. No pink or brown shells were found, ca. 80% snails have unbanded shells; among banded shells majority is constituted by 12345 and (12)345. Shells with no separate bands are rare. In Lvov morphs characteristic of natural distribution area are absent (10305) or rare (00300, 10345). Some rare morphs were found in the city.

STUDIES ON SEASONAL CHANGES IN MALACOCENOSES OF THE NATURE RESERVE BUKI NAD JEZIOREM LUTOMSKIM

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Qualitative and quantitative studies were conducted monthly from April 1993 till June 1994 in a beech forest and alder riverine forest of the nature reserve Buki nad Jeziorem Lutomskim. Thirty seven species of 14 families were recorded. The following species occurred in the quantitative samples from the beech forest: *Carychium minimum*, *C. tridentatum*, *Cochlicopa lubricella*, *Ena obscura*, *Discus rotundatus*, *Vitrea crystallina*, *V. contracta*, *Aegopinella pura*, *Ae. nitidula*, *Nesovitrea hammonis*, *Cochlodina laminata*, *Clausilia bidentata*, *Laciniaria plicata*, *Perforatella incarnata*, *Trichia hispida*, *Vittrina pellucida*. In the samples from the alder forest the same species were present, plus *Cochlicopa repentina*, *Vertigo pusilla*, *V. substriata*, *Punctum pygmaeum*, *Perforatella bidentata*, *Cepaea hortensis*, *Euconulus fulvus*. The snail density varied between months: in the beech forest from 3 to 104 indiv./m² with maxima in January and November, in the alder forest from 0 to 47 indiv./m² with maxima in August and April. The number of species varied as well, with maxima in beech and alder forest in autumn-winter months and August, respectively. Various species dominated in various months.

UNIONIDS IN THE LAKES OF WESTERN POMERANIA

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The studies started in 1992, 75 water bodies having been examined till now. In all the lakes at least two members of Unionidae were found, their vertical distribution being 0–40 m. All unionid species known from Poland except *Anodonta complanata* were recorded from each of the following lakes: Binowskie, Chłop, Długie, Swobnickie, Długie nr. Ińsko, Dołgie Mielęcińskie, Glinno, Jeleńskie, Kamienny Most, Kołczewo, Krzemień, Marianowskie, Morzycko, Narost, Płoń, Przybiernowskie, Resko, Chociwelskie, Wisola, Wełtyń.

LAND GASTROPODS OF A MANOR PARK IN RADOJEWO NEAR POZNAŃ

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The malacofauna of the park in Radojewo, established in post-partition times and maintained in an English style, 15 ha in area, was studied in 1997–1999. Since World War II, the park has not been subject to any management due to which a diverse shrub layer has developed. Thirty six gastropod species were recorded based on quantitative and qualitative studies, the most abundant being *Cochlicopa lubricella*, *Vallonia costata*, *Clausilia bidentata* and *Nesovitrea hammonis* (superdominants). Eudominants were: *Ena obscura*, *Vitrea crystallina*, *Carychium minimum*, *Vitrina pellucida*, *Cecilioides acicula*, *Acanthinula aculeata*, *Perforatella rubiginosa*, *Euomphalia strigella*, *Aegopinella pura* and *Nesovitrea petronella*, dominants: *Vallonia pulchella*, *Succinea oblonga*, *Zonitoides nitidus*, *Trichia hispida*, *Aegopinella nitidula*, *Acicula polita*, *Punctum pygmaeum*; subdominants: *Cepaea hortensis*, *Perforatella incarnata*, *Discus ruderratus*, *Vertigo pusilla*, *Euconulus fulvus*. The TDI value of 0.91 characterizes the malacocenosis as diverse and multi-component; the dispersion value was 6.8 which testifies to a clustered distribution.

SLUGS OF TURKEY

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Members of four slug families inhabit the vast area of Turkey: Limacidae, Agriolimacidae, Milacidae and Trigonochlamydidae. The critically revised list includes ca. 50 species (some still to be revised). Southern distribution borders of all the families just named are located in Turkey, only single milacid and limacid species reaching beyond the Turkish southern frontier.

Only widely distributed Agriolimacidae invaded more southern areas of Asia Minor. Turkish endemics are only 8, and including species shared with adjacent areas – further 4. The remaining species are known also from the Balkans and Crimea. Single Central European species recorded from Turkey are nearly certainly introduced. The best studied and the most favourable for slugs is northern Turkey; fewer species inhabit western areas adjacent to the Aegean and Mediterranean Seas. Central Turkey is poorly explored and unfavourable for slugs, while the eastern part of the country is practically unknown in this respect, though an endemic fauna may be expected there.

THE EFFECT OF SELECTED FACTORS ON THE MALACOFAUNA OF THE RIVER CYBINA IN POZNAŃ

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Mollusc samples were taken and physico-chemical and qualitative properties of water analysed in 1995–1996. The type of bottom proved to be the most important factor determining the mollusc fauna; other significant factors are ammonium nitrogen, BZT5, magnesium, hardness, copper, lead, cadmium.

HELICELLA OBVIA (MENKE) FROM THE VICINITY OF RZEPIN AND ŚWIEBODZIN (W POLAND)

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Helicella obviva was studied in three sites on the fringes of towns of Rzepin (localities I and II; 14°49'E, 52°21'N) and Świebodzin (locality III; 15°32'E, 52°15'N), of different vegetation and degree of pollution. Thirty largest specimens from each localities were measured (width of embryonic shell, width of increment from hatching till collecting, total width and height of shell, aperture height). No statistically significant difference was found between localities I and II; at these sites the snails were the largest at hatching but the snails from locality III displayed the highest increments.

A NEW SPECIES IN THE FAUNA OF UKRAINE – *SINANODONTA WOODIANA* – DIAGNOSTIC AND TAXONOMIC PROBLEMS

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Three specimens of *Sinanodonta woodiana* Lea, 1838 were collected in the Danube-Sasyk Channel in



SW Ukraine. The collected adult, of ca. 152 mm shell length, had glochidia in its marsupial sac. The species differs from European unionids in its shell shape, distinct coarse umbo structure and shape of glochidia (height/length ratio). Based on such diagnostic characters as umbo structure and shape of glochidia it is more correct to assign the species to *Sinanodonta* than to *Anodonta*.

THE GENUS *HYPANIS* IN THE WATERS OF UKRAINE

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The material of bivalves of the genus *Hypanis* (fam. Limnocardiiidae) was collected in the lower reaches of the Danube. The genus differs from cardiids in the presence of the mantle line within sinus. According to the literature, Ukrainian waters harbour *H. caspia*, *H. pontica*, *H. angusticostata*, *H. jalpusensis*, *H. colorata*, *H. laeviscula* and *H. plicata*. The main diagnostic feature, used in identification keys, is the depth of sinus and some other morphological traits. Since these parameters are variable, at present anatomical and statistical approaches to the taxonomy of the genus are proposed. Members of *Hypanis* inhabit estuary waters of low salinity and are sensitive to hyperaccumulation of organic matter. Recently changes have been observed in the occurrence of the genus: on one hand its abundance decreases in natural habitats, on the other its members appear in typical freshwater bodies.

POPULATIONS OF *UNIO CRASSUS* OF SMALL SUBMONTANE RIVERS

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Unio crassus is associated with pure running waters on sandy or sandy-stony substrata. Its abundance is decreasing, probably because of changes in water

chemism. On the Red List of Threatened Animals of Poland the species has been qualified as going extinct; the phenomenon has a global character. To provide a basis for its active protection, rivers and streams of Pogórze Wielickie were searched for its presence. As a result, it was recorded from four rivers: Wilga, Głogoczówka, Harbutowka-Skawinka and Cedron. The rivers flow in deep valleys, in narrow beds with coarse rubble and numerous rapids. The species is most often found below meanders where the main current crosses the bed, or on the inner arc of the meander. They are usually stuck in the slope of the river bed 5–50 cm below water surface and ca. 1 m from the bank. Their siphons are directed perpendicular to the current. The highest density was observed in the Cedron river – ca. dozen indiv./m². The most frequent class were bivalves 4–6 years old, 45–55 mm long.

SELECTION OF THERMAL MICROHABITATS BY *LYMNAEA STAGNALIS* UNDER EXPERIMENTAL CONDITIONS

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Parasite infection may be a factor modifying thermal behaviour of ectothermic animals. Snails infected with paratenites of digenetic trematodes are convenient models for such studies. In this study thermal behaviour of naturally infected *Lymnaea stagnalis* was analysed in order to answer the question whether they have preferences towards microhabitats of different temperature. Thermal behavior was found to differ between infected and parasite-free animals. The latter selected decidedly higher temperatures, avoiding temperatures below 18°C. Infected snails showed no preferences, spending a considerable part of their time at temperatures below 18°C. The next stage of the studies will involve an attempt at checking if the parasite manipulates its host or if it is the host that initiates the changes.