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Žijící hydrobiologická legenda aneb Jaroslav Hrbáček pětáosmdesátiletý

V plné duševní svěžesti se 12. května dožil 85 let zakladatel moderní československé limnologie docent RNDr. Jaroslav Hrbáček, CSc. Před „nedávnem“ zrekapituloval jubilantovu vědeckou dráhu dlouholetý kolega Pavel Blažka (LimNo 2/2001). Na poválečné začátky limnologie ve Viničné minulě zavzpomínal sám jubilant u příležitosti nedožitých osmdesátin kolegy Lelláka (LimNo 1/2006), jeho první hydrobiologické působiště – tůň v Polabí – se pod jeho jménem dostalo mezi turistická nej (LimNo 1/2005). Co ještě dodat – kromě samozřejmé gratulace?

Zatímco jiní důchodci se odhlašují z ČLS, jubilant se tehdy vrátil k výzkumu tůní – pro změnu v nivě horní Lužnice ... a dodnes bádá nad zákonitostmi sezónní sukcese planktonu ve Slapské nádrži – což názorně ilustrují Fottovy momentky ze společného výzkumu. O jubilantových zásluhách o světovou limnologii nechť (netradičně) promluví jiní – překladu doufám netřeba... - jv -



Jaroslav Hrbáček při pravidelné týdenním odběru planktonu Slapské nádrže z Živohošťského mostu
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Momentka ze zimního odběru na dvoře slapské hydrobiologické stanice, kterou před téměř 50 léty J. Hrbáček v Akademii zakládal

The Living Legend

It is not a common phenomenon to be a living legend within one's own scientific field(s). Prof.em. Dr. **Jaroslav Hrbáček** is such a person.

In the late 1950s, J. Hrbáček and his colleagues initiated early research on what has now grown to a whole scientific field within aquatic sciences: how predators control lower trophic levels and, thus, the entire food web, and how nutrients are dispersed by predators to affect aquatic ecosystems. His wide and general knowledge of plankton ecology, phenotypical characters, biotic influence in shaping aquatic ecosystems, allowed J. Hrbáček to develop general theories between fish and their food items, and lower trophic levels. The so-called biomanipulation field with all its subsequent theoretical and practical ramifications was totally dependent on such early – and creative research.

J. Hrbáček and his gifted co-workers developed in the end of the 1950s and early 1960s general ecological patterns which later whole scientific fields in aquatic science were depending upon. And moreover – they did this very early: 5–10 years before the rest of the scientific world and 15–20 years before the important field of biomanipulation developed into its full practical capacities.

It is easy to copy – but extremely difficult to be the first and in the front within a developing scientific field, and stay there for decades. Still, these early findings are of daily use in food-web theory, cascade-theory, and predation and nutrient influence on water systems – seldom any paper in present-day research within the very basis of applied science in freshwater ecology, fail to refer to the early beautiful and interesting papers of J. Hrbáček.

The history does not end with this. One of the most challenging fields of aquatic ecology is the effect of environment on the ecology of species. J. Hrbáček and his efficient group has taken important or keystone species from the aquatic ecosystems into the laboratory and cultured them to investigate the effect of genotype or phenotype on their evolutionary place in the food web. Often they have studied the important, and very difficult, genus *Daphnia*, the most important filter-feeder and energy converter within the aquatic pelagic food web. They have investigated the reason for their presence or absence, and many of the ecological relationships between their predator (fish), and algal and bacterial food. These careful and detailed studies were often performed together with his wife Dr. Marta Esslová-Hrbáčková.

Simultaneously, J. Hrbáček started to investigate the total taxonomy and systematics of the notoriously difficult freshwater taxon *Daphnia*. In this work, he is following the well-established and very solid Czech tradition of systematics and autecology of pelagic organisms that already was initiated in the 1870–1880s with Hellich, Eylmann and Frič¹. J. Hrbáček has for several decades, since the 1950s, delivered very crucial input to the solution of the systematics, taxonomy, and phylogeny of this most important plankton group. One cannot do sound freshwater research without a firm taxonomic knowledge.

His thorough knowledge of all aquatic organisms has allowed him to further study the relationship between Cladocera and eutrophication, and other sorts of pollution, another extremely wide field within freshwater science.

Being a general naturalist and specialist, he and his colleagues have furthermore set up the European geographical distribution pattern of the important Cladocera group, within the scientific field of biodiversity – together with taxonomy a key-field in the research of climatic change.

In all the scientific fields above, most of them major fields of water-related research and function, he was always among the first, and that is one of the characteristics of this living legend within aquatic science.

His total scientific merit and early initiations of whole scientific fields, combined with a very original approach, and his very special “scientific nose” for important questions – and answers – within the whole field of water activities, makes him an obvious choice.

- Prof. Jens Petter Nilssen, Niels Henrik Abel's Centre for Mathematics and Natural Sciences, Gjerstad, Norway -

¹ za povšimnutí určitě stojí obdivuhodná znalost historických českých limnologických osobností

Jaroslav Hrbáček is one of the outstanding aquatic ecologists of the 20th century. More than one stimulating discovery in aquatic community ecology can be ascribed to him. In his paper “Typologie und Produktivität der teichartigen Gewässer” (Hrbáček 1958b) he described the influence of the fish stock on the zooplankton size structure seven years before J. L. Brooks and S. I. Dodson published their well-known size efficiency hypothesis. J. Hrbáček developed his early ideas regarding the relation between fish and zooplankton consequently to a theory of the top-down effects of fish on the whole pelagic food chain. In one of his key papers (Hrbáček et al. 1961) he wrote together with three colleagues of his laboratory the most remarkable sentence “...the biocenotic relations between the fish stock and the plankton ... are at least as important as the influence of the physical and chemical factors for the formation of the plankton association...”. This idea was so new and revolutionary that hardly any scientist believed him at that time although he and his group from Prague had shown the validity of this idea in an impressive whole-lake experiment using two backwaters of the Elbe River. Largely neglected during the following years, this work was only recognised 14 years later when J. Shapiro published his spectacular paper on “biomanipulation”. Today all limnologists agree that J. Hrbáček’s work on the Elbe backwaters was the starting point for numerous ideas and hypotheses in the field of aquatic community ecology, such as the cascade hypothesis (Carpenter et al. 1985) or the top-down–bottom-up theory (McQueen et al. 1986), or the hypothesis of the biomanipulation efficiency threshold of the phosphorus loading (Benndorf 1987). These hypotheses are the theoretical basis for an enormous amount of scientific investigations and papers during the last one or two decades. J. Hrbáček’s early experiments showed their pioneering character not only with respect to the underlying hypothesis but also regarding the method used. I do not know any whole-lake experiments in limnology before the mid-1950s; the time when his experiments were carried out. By focussing on these few but most important examples, I hope to have illustrated my introducing statement that J. Hrbáček is indeed one of the outstanding aquatic ecologists of the 20th century.

However, his work was not only stimulating in the field of science. Based on his ideas a whole strategy of in-lake control of water quality by controlling the food web from the top (piscivorous fish) to the bottom (primary producers) has been derived. This new strategy has been developed towards a modern tool in integrated water management called “ecotechnology” which provides the basis for a more effective protection and management of freshwaters. Thus, J. Hrbáček contributed essentially to science and management. And he achieved this progress under the working conditions in a so-called “socialist country” where almost all resources were extremely limited.

- Prof. Jürgen Benndorf, Technische Universität Dresden -

Jaroslav Hrbáček is one of the most outstanding senior limnologists and his ideas constitute a reference for all the people studying lakes. As Institute we are deeply indebted to J. Hrbáček because, having the opportunity to collaborate with him since the early 1960s, we were introduced by him in a more holistic approach to the study of lakes and particularly in the studies of trophic chain interactions and the possibility to utilise top-down forces to control, via aquatic food chain, the quality of lake environment.

Since his pioneering studies, the biomanipulation ecotechnology has diffused all over the world becoming an important approach to reduce negative effects of the eutrophication of lakes. However, it was not only a problem of new technique but, more and more, an occasion to deepening and refining our ideas about lake functioning.

In effect, the ecosystem approach, which he applied early in the history of limnology considering the complex interactions of biotic and abiotic compartments of lakes, produced a series of studies that allowed us to improve the management of lakes on a scientific basis.

These are only some of the contributions given by J. Hrbáček to the development of limnological research and in particular those that we had the opportunity to experience directly with him.

However, the activity of J. Hrbáček encompassed a wider field of topics in limnology, always introducing innovative ideas and advanced results.

- Dr. Riccardo de Bernardi, C.N.R. – Istituto per lo Studio degli Ecosistemi, Verbania Pallanza -

I have known Professor Hrbáček for more than four decades. His 1960–1962 publications and my student's visits to his Institute in Prague in the late 1960s were among the most enlightening moments of my early scientific life. His ideas have been and are still important to me in my understanding the keystone rules by which natural populations and communities are organised. The role of Professor Hrbáček in my scientific inspirations has been often reflected in my publications, also in my recent book on the ecology of offshore animals (Gliwicz 2003), where Professor Hrbáček's perception of the role of predation in structuring prey communities has been broadly advertised and showed to be historically the first breakthrough into the nature of the trophic cascades.

In his early papers depicting the effects of fish eradication in small backwaters and fish ponds in Bohemia, Professor Hrbáček was the first who showed that predation by planktivorous fish is a fundamental factor responsible for the structure of zooplankton prey communities. He opened a new way of understanding the role of fish predation in allowing coexistence of multiple prey species by preventing a superior competitor from monopolising resources and causing all competitively inferior species to be excluded at food levels too low for them to grow and reproduce.

These early papers (Hrbáček et al. 1961, Hrbáček 1962) were the milestones in aquatic ecology. They were also obvious inspirations for very general ecological concepts of last decades from “*diversity promoted by predation*” (Paine 1966) to “*size-efficiency hypothesis*” (Brooks & Dodson 1965), “*biomanipulation*” (Shapiro et al. 1975) and “*trophic cascades*” (Carpenter et al. 1985).

Professor Hrbáček's ideas were widely known in spite of the fact that the most important of them have been first published in Czech in local journals of narrow circulation. However, being incorporated into papers well-published in very prominent journals by our American colleagues, they soon become accepted worldwide as Hrbáček's ideas, but often cited without a reference to the Hrbáček's respective paper. Thence, the number of Hrbáček's citations is lower than expected from the fame of his name in aquatic ecology and limnology. Yet, in spite of this, according to the Science Citation Index (2004), in the period of last 8 years (1996–2003) it was reasonably high (327) even though most of these citations regarded his early papers of 1961 (119 citations) and 1962 (30 citations) papers. These numbers are amazingly high for the papers that are more than 40 years old and are not cited because of a reference to a commonly accepted method.

The publications of Professor Hrbáček have not only made a tremendous impact on the state of art in aquatic ecology, but they have also caused a dramatic change in the environmental policy practice. On the one hand, they opened new ways of understanding the prey-predator systems in aquatic habitats and elsewhere, on the other hand, they initiated a new approach to the water quality protection and lake restoration, allowing a new alliance between fisheries and water management by seeking a compromise between the conflicting efforts to increase fish yields and improve water quality.

- Prof. Zbigniew Maciej Gliwicz, Zakład Hydrobiologii, Uniwersytet Warszawski -

Dr. Hrbáček is a researcher who really has influenced and changed our view on the biological processes in fresh water. He was the first to demonstrate the importance of food web structure for the water quality and biological dynamics in lakes. When he and his co-workers made experiments in the backwaters of the Elbe in Czechoslovakia in the end of the 1950s (Hrbáček et al. 1961) they found that top predators not only affected the prey, but in a cascading manner affected the whole ecosystem. This was a new idea in contrast to the ruling paradigm at that time, namely that only the nutrient loading was significant for the amount of algal biomass in water bodies. It took many years before the attitude changed, but Hrbáček was right, and it is now generally accepted that the top down forces from predation function together with the bottom up forces created by the resource availability in shaping the biological communities in lakes.

Dr. Hrbáček has through his entire career been recognised as world specialist on the systematically difficult crustacean genus *Daphnia*. Since these animals play an important role in creating what later was called “the clear-water phase” (Lampert & Schober 1978), it was not so strange that just he found that daphnids were the key organisms in the system. They were on one side extremely

efficient in grazing down algal blooms in lakes, but on the other side very vulnerable to fish predation. Thus, under heavy fish predation their number was so much reduced that they could not control the phytoplankton. It took some time before Hrbáček's work became recognised, but it is now fully acknowledged that Hrbáček was the first who pointed out the importance of predators in aquatic ecosystems. His early papers are now cited in all the leading textbooks in limnology and freshwater ecology.

Dr. Hrbáček's findings have had a considerable influence on the research in aquatic biology over the last 30 years. Of particular importance was the paper by Brooks and Dodson in *Science* 1965 (Brooks & Dodson 1965) where they formulated their elegant "*Size efficiency hypothesis*" based very much on the same ideas as Hrbáček had brought up. Later came the ideas of "*Bio-manipulation*" created by J. Shapiro (Shapiro et al. 1975) and the "*trophic cascade*" effects in lakes studied by Carpenter and Kitchell (1993). The first introduced the idea that water quality could be improved by manipulating the food web, and the others demonstrated how complex the effects in a lake would be if one introduced or removed a top predator in the system. In the 1980s and 1990s the research on top-down effects was very dominating and controversial in freshwater research. Many researchers tried out the new ideas and several symposia were held to discuss food web effects in ecosystems.

In my opinion Dr. Hrbáček is an outstanding limnologist and few, if any other aquatic scientists, can document to have inspired to so much activity in the scientific world as Dr. Hrbáček has. He was the first mover to create a basis for a better understanding of how top-down forces directly affected the water quality and the dynamics in freshwater habitats.

- Prof. Petter Larsson, Universitetet i Bergen -

I have met Dr. Jaroslav Hrbáček for the first time in 1952 as a high-school student interested in freshwater ecology. Later in 1956, as one of his M.Sc. students, I have joined his team working on oxbows and backwaters of the Elbe River. My understanding, at that time, of the possible importance of his approach to the analysis of dominant factors governing most of the features of water bodies was limited. However, the enthusiastic atmosphere of his team and Spartan facilities for the research in the field were intellectually attractive and new for a freshman at the university and influenced my entire future professional carrier.

Dr. Hrbáček left the Charles University in 1959 for the newly founded Hydrobiological Laboratory of the Czechoslovak Academy of Sciences and I have joined the faculty as an assistant professor in 1960. Nevertheless, we always discussed and up to now continuously exchange our opinions on various problems of freshwater ecology.

I am regarding Dr. Hrbáček as one of the most influential persons in European aquatic ecology in the 20th century. The results of his research changed our approach to freshwater environment and his type of analytical thinking influenced at least two generations of young scientists in former Czechoslovakia. His custom to challenge any commonly accepted theoretical "cliché" not supported and confronted with hard field or laboratory data was always refreshing and one of the reasons for his influential position among the limnological community.

His "whole-lake" experiments (removal of fish populations) testing his hypothesis about the direct influence of fish predators on zooplankton and their indirect impact on other properties of a water body started already in 1950 and proceeded until 1959. Results of those experiments were presented in his papers published in 1958 (Hrbáček 1958a), 1961 (Hrbáček et al. 1961) and 1962 (Hrbáček 1962) as a contribution to the theory of aquatic ecology and a new paradigm in limnology. The regulating role of piscivorous fish in those experiments became later a part of the bio-manipulation practice. Theory, which was enthusiastically accepted or hotly rejected at the time of its formulation, is now a part of handbooks and treatises on limnology for students even outside Europe. Throughout his professional career, he gradually enlarged the scope of the interest of his team from habitats like small water bodies and fish ponds in the early 1950s to large newly built reservoirs in the 1960s and later.

His second field of interest was the biology, ecology and taxonomy of the genus *Daphnia*. Species of the genus are closely connected to the mechanism of fish impact on the zooplankton. His re-

sults were published in several papers and his knowledge of Holarctic members of the genus was summarised in a chapter of a book (Hrbáček 1987).

All his scientific activities were realised in the politically and economically very difficult environment. Three times during his career it was necessary for him to built a totally new laboratory: first in 1950 at the Charles University, in 1960 at the Academy (Hydrobiological Laboratory), and in 1980 after moving some Academy Institutes from Prague to České Budějovice (at the Institute of Landscape Ecology). As the head of the research team, he always produced a very freethinking milieu, where everybody felt as an important but independent member; all of them, however, working for the solution of a commonly accepted problem.

- Prof. Vladimír Kořínek, Přírodovědecká fakulta Univerzity Karlovy v Praze -

„Obávaný“ Hrbas

Aby nedošlo k nedorozumění, jedná se o autentickou citaci. Kdy, kde, jak? Oslava 50. výročí založení Blatenské terénní stanice v roce 1975, okolí táboráku, po půlnoci. Fyziologická potřeba mne zavedla do křoví, před sebou jsem uviděl ve tmě postavu: „Kdo je tam, abych ho nepo...“. Ozvalo se: „To jsem já, obávaný Hrbas.“ – „Proč obávaný?“ – a následoval pro mě velmi poučný rozhovor, který si dost pamatuji a něčím z něj se stále řídím. Vida, jaká moudra člověk někdy pochytl v křoví. Možná se někdo Hrbáčka obával, snad proto, že v odborných diskusích jeho myšlenky často předbíhaly vyřčená slova...

Nebudu opakovat Hrbáčkův přínos pro českou hydrobiologii. To bylo řečeno již mnohokrát a zaslouží si to mimořádný respekt. Mně nejvíce přinesly příležitostné debaty o obecných věcech kolem toho, co by se mělo zkoumat a jak to organizačně zajistit.

Obdivuji Hrbáčkův elán, se kterým se stále věnuje vědecké práci. Kéž by to bylo dopřáno i nám mladším. Stále studuje Slapskou nádrž z hlediska dlouhodobých změn. Používá efektivní zjednodušené metody – jeho sledování nádrže z mostu je svým způsobem unikátní. Kromě toho obdivuhodně zvládá moderní počítačové metody.

Jsem velmi rád, že mohu působit na pracovišti, které doc. Hrbáček založil. Doufám, že jsme ve stávajícím BC AV ČR, HBÚ důstojnými pokračovateli.

Pane docente, přeji Vám hlavně pevné zdraví a ať Vám vydrží obdivuhodná vitalita.

- doc. Josef Matěna, Hydrobiologický ústav, BC AV ČR, České Budějovice -

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Zápis ze schůze HV ČLS, konané dne 20. 4. 2006 v Praze

Přítomni: dle prezenční listiny

- 1. Kontrola zápisu** z minulé schůze HV ČLS: zápis byl schválen
- 2. Hospodaření ČLS** (M. Drápala):
 - 12. 4. provedl finanční úřad kontrolu účetnictví ČLS zaměřenou na využití prostředků z dotace RVS za období 2002 – 2004. Nebyly zjištěny závady, definitivní výsledek oznámí FÚ 27. 4.
 - na účet ČLS přicházejí platby účastníků konference; zatím není problém s jejich rozlišením
 - HV ČLS schválil uzavření dohody o provedení práce s účetní ve výši 5000,- Kč
- 3. Matrika** (B. Desortová):

Členství zrušené na vlastní žádost:
Merta Lukáš, RNDr., Ph.D.

Změny v adresáři:
Rulík Martin, Doc. RNDr., Ph.D.
- 4. Limnologické noviny** (J. Vrba):
 - příspěvky do *LimNo* 2/2006 je nutno dodat redaktorovi do 20. 5.
- 5. XIV. konference ČSL a SLS** (V. Sacherová):
 - zatím přihlášeno cca 145 účastníků
 - přihlášené příspěvky: cca 55 přednášek; 40 posterů
 - publikace příspěvků:
 - a) sborník abstraktů (bude k dispozici účastníkům konference): příspěvky je nutno dodat do 30. 4. 2006
 - b) vybrané příspěvky budou publikovány v recenzovaném časopisu *Acta Universitatis Carolinae – Biologica*; příspěvky (v angličtině) je nutno dodat do 30. 6. 2006
 - aktualizované informace jsou k dispozici na: www.natur.cuni.cz/ekologie/CLS2006
- 6. Valné shromáždění ČLS** (L. Havel):
 - bude se konat v rámci XIV. konference ve středu 28. 6. 2006 v 19:00 hodin
 - M. Drápala zajistí vypracování revizní zprávy
 - volby HV ČLS na období 2006 – 2009: předsedové poboček Brno a České Budějovice doplní návrh kandidátky
 - L. Havel rozešle všem členům ČLS pozvánku na valné shromáždění + volební lístek
- 7. Příští schůze HV ČLS** se bude konat 26. 6. 2006

- Zapsal: L. Havel -

Oznámení o akcích

• 8th Subfossil Cladocera Workshop

Další **pracovní seminář** mezinárodní skupiny odborníků, kteří se zabývají zbytky perlooček v sedimentech jezer, se uskuteční ve dnech **26. a 27. září 2006** na Přírodovědecké fakultě UK v Praze.

Jde o neformální setkání, zaměřené na taxonomické problémy, ale také na výměnu zkušeností s determinací zbytků a na pomoc začínajícím kolegům. První den bude uspořádán jako seminář či minikonference, kde se každý z účastníků představí a stručně seznámí ostatní se svou prací nebo před-

nese krátký odborný příspěvek. Druhý den je uspořádán jako mikroskopické praktikum – prosíme zájemce, aby přinesli své vzorky či trvalé preparáty, zejména mimořádně krásné, zajímavé či obtížně identifikovatelné nálezy. Seminář je bez vstupního poplatku, ubytování a stravování s výjimkou malého občerstvení si bude každý hradit sám. Příspěvky účastníků tohoto semináře budou publikovány samostatně (jako Proceedings) v časopise Polské akademie věd *Studia Quaternaria*.

Předsednictví přislíbily vedoucí osobnosti této nevelké, ale stále rostoucí mezinárodní pracovní skupiny: dr. Krystyna Szeroczynska (Institute of Geological Sciences, Polish Academy of Sciences, Warsaw) a dr. Kaarina Sarmaja-Korjonen (Department of Geology, University of Helsinki, Helsinki).

Před seminářem nebo po něm bude zřejmě uspořádána 1–2 denní exkurze, nejspíše na šumavská jezera a do jižních Čech.

Závazné přihlášky do 22. 8. 2006, kontakt: Zuzana Hořická (Katedra ekologie PřF UK Praha), tel.: 221 951 806; e-mail: zhoricka@cesnet.cz - zh -

Publikace a recenze

Addenda to Floating Islands: A Global Bibliography by Chet Van Duzer (viz recenzi J. Květa v *LimNo* 4/2004). 47 pages including sixteen photographs (eleven in color). E-Book in Adobe Acrobat PDF. ISBN-10: 0-9755424-1-9; ISBN-13: 978-0-9755424-1-5

The Addenda to Chet Van Duzer's *Floating Islands: A Global Bibliography* contain almost 200 new citations on the all aspects of the subject; they include material on floating islands that formed since the publication of *Floating Islands*, unique historical descriptions of several floating islands that no longer exist, and important new references on floating islands seen at sea and on the dispersal of species on floating islands. The entries are annotated and cross-referenced, and are followed by a geographical and thematic index. The book also includes an account of the author's visit to the rare intermittent floating island in Derwentwater, Cumbria, England, as well as sixteen photographs of floating islands around the world. The photographs of the floating island in Derwentwater in the Addenda are among the first color images ever published of that island. If you already own *Floating Islands*, you will certainly want the Addenda; if you have not yet seen the book, the Addenda will give you a good idea why reviewers have called *Floating Islands* "masterful", "definitive", "exhilarating", and "amazing", and have insisted that "every environmental-related institute should acquire a copy."

For a limited time the publisher has made the 1.8 MB PDF file available as a free download at this address: <http://cantorpress.com/floatingislandsaddenda> -red-

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