

## Dr. Mikhail A. Beketov

I am a quantitative aquatic ecologist. My aim is to improve the analysis and prediction of effects of chemical contaminants and other anthropogenic and natural factors on biological communities at large spatial scales. I believe that this can only be achieved by the coherent development of (i) statistics and modelling, (ii) community- and macroecology, and (iii) environmental toxicology and risk assessment. Therefore, my work is interdisciplinary across these three areas of research. It is intended that the results of my work should provide a scientific background for landscape management and environmental risk assessment.



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Born: 1976

Languages: English (working language since 2005), Russian (mother tongue), German (intermediate)

### Curriculum Vitae Content:

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## Research Interests

Statistical and trait-based methods for noisy multivariate data.

Freshwater macroecology and community ecology: effects of multiple factors at large spatial scale, diversity gradients.

Risk assessment and ecotoxicology: effect and recovery, multiple stressors, life-cycle traits, trait-based and taxonomy-based bioassessment indices.

## Academic Background

Ph.D. in Ecology. Awarded in 19 March 2004 by the council of Novosibirsk State Agriculture University, Novosibirsk, Russia (Russian equivalent of Ph.D. named as C.Sc., Candidate of Science).

University Diploma, Biology and Chemistry. Graduated in 1998 from Novosibirsk State Pedagogical University, Novosibirsk, Russia, graduated.

## Appointments

05.03.2006 – present      Researcher at the Helmholtz Centre for Environmental Research – UFZ, Leipzig, Germany.

01.09.2005 – 22.12.2005      Guest Researcher at the Helmholtz Centre for Environmental Research – UFZ, Leipzig, Germany.

2002 – 2006      Hydrobiologist at the Western-Siberian Centre for Environmental Monitoring, Novosibirsk, Russia.

2004 – 2005      Entomologist at the Institute of Systematic and Ecology of Animals, Siberian Branch of Russian Academy of Science, Novosibirsk, Russia. (part-time)

## Fellowships, Awards, and Achievements

Selection of the article “Beketov M.A., Liess M., 2012. Ecotoxicology and macroecology - Time for integration. *Environmental Pollution*, 162: 247-254.” by the F1000 panel (Faculty of 1000 post publication peer review, 2012) in the top 2% of articles in biology and medicine published in 2012.

Marie Curie Incoming International Fellowship (awarded in 2005 by EU). 2 years, 315,000 €.

Humboldt Research Fellowship (awarded in 2005 by Alexander von Humboldt Foundation, Germany). Awarded but refused by me due to overlap with the Marie Curie IIF (see above).

Certificate of honour for contribution to development of Russian biological science and organising the conference “Autumn Zoological session” (awarded in 2006 by Novosibirsk State Pedagogical University, Russia).

Finalist of the LRI Innovative Science Award (awarded in 2007 by CEFIC – European Chemical Industry Council).

Research fellowship by Saxony State Ministry for Science and Art (awarded in 2005). 4 months.

## Coordinating, Supervising, Organising & Reviewing

Coordinating the German-Russian project ECOLINK (funded by Helmholtz Foundation and Russian Fund for Basic Research). 3 years, overall budget 427,000 €.

Coordinating the project Integrated assessment of toxic risks in aquatic ecosystems, INTEGRATE (funded by UFZ, Helmholtz Foundation). 5 years. (deputy of coordinator)

Coordinating the EU-funded project Improving EU-risk assessment of toxicants for aquatic communities by considering competition on the population and community level, INTERACT. 2 years, overall budget 315,000 €.

Supervising post-graduate fellows (international training program Leonardo da Vinci - Unipharma Graduates 2, 3 fellows, 6 months each, overall 8,600 €), and 3 PhD students (projects ECOLINK and INTEGRATE).

Evaluating project proposals for the German Research Foundation, DFG (Deutsche Forschungsgemeinschaft).

Organising a special session “Landscape ecotoxicology and spatially explicit risk assessment” at the 6th SETAC World Congress / SETAC Europe 22nd Annual Meeting, Berlin, Germany, 2012.

Organising a special session “Aquatic and terrestrial mesocosm and field studies - Messages from complex systems to academia, regulators, and industry” at the SETAC Europe 21st Annual Meeting, Milan, Italy, 2011.

Organising a special session “Biological, ecological and ecotoxicological traits – current developments and future directions” at the ASLO/NABS Joint Meeting, Santa Fe, USA, 2010.

Organising the local scientific conferences “Autumn Zoological Sessions”, Novosibirsk, Russia. Editing the proceedings.

Evaluating project proposals for the fund BARD, The United States - Israel Binational Agricultural Research & Development Fund.

Reviewing activity for the journals: *Environmental Science and Technology*, *Journal of Applied Ecology*, *Environmental Pollution*, *Chemosphere*, *Oecologia*, *Oikos*, *Environmental Toxicology and Chemistry*, *Science of the Total Environment*, *Water Science and Technology*, *Environmental Monitoring and Assessment*, and others.

## Invited Lectures & Teaching

Invited lecturer at the University of Lorraine, Metz, France, 5 June, 2012.

Invited lecturer at the University Koblenz-Landau, Landau, Germany, 12 July, 2012.

Lecturer at the short course “Linking community data and exposure for mesocosms and field investigations – The SPEAR approach”, at the 6th SETAC World Congress / SETAC Europe 22nd Annual Meeting, 20 – 24 May, 2012, Berlin, Germany.

Lecturer at the short course “Linking community data and exposure for mesocosms and field investigations – The SPEAR approach”, at SETAC Europe 21th Annual Meeting, 15 – 19 May 2011, Milan, Italy.

Lecturer at HIGRADE – Helmholtz Interdisciplinary GRADuate School for Environmental Research. Annual lecturing programme (2008 – 2013).

Lecturer at the advanced course for PhD students “Ecological effects of aquatic toxicants – Assessment at different levels of ecological complexity”. 20 – 25 September 2010, UFZ, Germany.

Invited lecturer at international lectureship programme INNOLEC, Masaryk University, 26 – 27 November 2009, Brno, Czech Republic.

Lecturer at the short course “Linking community data and exposure for mesocosms and field investigations – The SPEAR approach”, at SETAC Europe 20th Annual Meeting, 23 – 27 May 2010, Seville, Spain.

Invited presenter at international EU-funded symposium “FACEIT, International Symposium on Monitoring Effects of Aquatic Oil Pollution”, 20 – 22 January 2009, Leipzig, Germany.

Invited lecturer at international workshop “REP-LECOTOX 2nd Workshop, Trends in Ecological Risk assessment” (funded by EU), 21 – 23 September 2009, Novi Sad, Serbia.

## Projects

PETRO-SPEAR, Development of bioindicators of aquatic ecosystem contamination with hydrocarbons (funded by Total Petrochemicals, France). 3 years, overall budget 230,600 €. Principal Investigator.

ECOLINK, Understanding effects of environmental toxicants at population and community levels: A link between ecotoxicological experiments and field observations within Eurasian climate scenarios (funded by Helmholtz Foundation, Germany and Russian Fond for Basic Research, Russia). 3 years, overall budget 427,000 €. Coordinator.

Improving EU-risk assessment of toxicants for aquatic communities by considering competition on the population and community level, INTERACT (funded by EU). 2 years, overall budget 315,000 €. Principal Investigator, coordinator.

Integrated assessment of toxic risks in aquatic ecosystems, INTEGRATE (funded by UFZ, Helmholtz Foundation). 5 years. Deputy of coordinator.

Freshwater biological indicators of pesticide contamination – An adaptation of the SPEAR approach for the UK (funded by Environmental Agency, UK). Overall budget 50,000 €. Contributor.

Conservation of biodiversity of aquatic organisms and regulation of ecological risks of pesticides (funded by German Federal Environmental Agency, UBA). Overall budget 17,600 €. Contributor.

Evaluation of the action of selected environmental chemicals to initiate drifting of macroinvertebrates in streams (funded by German Federal Environmental Agency, UBA). Overall budget 26,000 €. Contributor.

Harmonised environmental indicators for pesticide risk, HAIR (funded by EU). Contributor.

## Publications

### Overview:

33 articles in peer-reviewed scientific journals covered by *ISI* (23 as a first author, 5 as a last author, journal impact factor up to 9.7, *ISI* citation number: 401, *H*-index: 14)

9 articles in peer-reviewed scientific journals not covered by *ISI*

1 book chapter

7 articles in popular science periodicals

7 technical scientific reports

1 database

84 conference abstracts

(Complete list of publications is available upon request)

### Articles in peer-reviewed *ISI*-listed journals:

In preparation/submitted

Stampfli N.C., Knillmann S., Noskov Yu.A., Schäfer R.B., Liess M., **Beketov M.A.**, 2013. Environmental stressors may enhance development of community tolerance to a toxicant. *Ecotoxicology*, in revision.

Jesenská S., Bláha L., Liess M., Schäfer R.B., **Beketov M.A.**, 2013. Comparison of the Species Sensitivity Distribution (SSD) with ecologically relevant SPEAR index in the retrospective risk assessment of pesticides. in preparation.

Münze R., Khrycheva P., Gunold R., Paschke A., Kaske O., Hundt M., Bauer C., Möder M., Liess M., **Beketov M.A.**, 2013. Effects of pesticides on the structural and functional parameters of invertebrates in streams in moderately intensive agricultural landscape. in preparation.

Schröttle P., Pissarello A., Cailleaud K., Bassers A., Liess M., **Beketov M.A.**, 2013. Toxicity of kerosene to stream invertebrates - Do we underestimate effects of petrochemicals in standard toxicity tests? in preparation.

**Beketov M.A.**, Stampfli N.C., Yurchenko Yu.A., Belevich O.E., Knillmann S., Noskov Yu.A., Liess M., 2013. Community sensitivity to a xenobiotic can be predictable – A cross-Eurasia experiment revealed strong and consistent modulations. in preparation.

**Beketov M.A.**, Verberk W.C.E.P., Beisel J.N., Carlisle D.M., Dolédec S., Liess M., Usseglio-Polatera P., 2013. Trait-based approaches: perspectives on environmental diagnoses and prognoses. in preparation.

2013

33. **Beketov M.A.**, Kefford B.J., Schäfer R.B., Liess M., 2013. Pesticides reduce regional biodiversity of stream invertebrates. *PNAS*, 110(27): 11039-11043.

32. **Beketov M.A.**, Kattwinkel M., Liess M., 2013. Statistics matter: Data aggregation improves identification of community-level effects compared to a commonly used multivariate method. *Ecotoxicology*, in press.

31. **Beketov M.A.**, Cedergreen N., Wick L.Y., Kattwinkel M., Duquesne S., Liess M., 2013. Sediment toxicity testing for prospective risk assessment – A new framework and how to establish it. *Human and Ecological Risk Assessment*, 19: 98-117.

30. Stampfli N.C., Knillmann S., Liess M., Noskov Yu.A., Schäfer R.B., **Beketov M.A.**, 2013. Two stressors and a community – Effects of hydrological disturbance and a toxicant on freshwater zooplankton. *Aquatic Toxicology*, 127: 9-20.

29. Schäfer R.B., Gerner N., Kefford B.J., Rasmussen J., **Beketov M.A.**, de Zwart D., Liess M., von der Ohe P.C., 2013. How to characterize chemical exposure to predict ecologic effects on aquatic communities? *Environmental Science and Technology*, 47: 7996-8004.
28. Knillmann S., Stampfli N.C., Noskov Yu.A., **Beketov M.A.**, Liess M., 2013. Elevated temperature prolongs long-term effects of a pesticide on *Daphnia* spp. due to altered competition in zooplankton communities. *Global Change Biology*, 19(5): 1598-1609.

2012

27. **Beketov M.A.**, Liess M., 2012. Ecotoxicology and macroecology - Time for integration. *Environmental Pollution*, 162: 247-254. (*this article was included in the top 2% of published articles in biology and medicine in 2012 by F1000, and included in the key articles by the Earth Emphasis*)
26. Liess M., **Beketov M.A.**, 2012. Rebuttal related to "Traits and Stress: Keys to identify community effects of low levels of toxicants in test systems" by Liess and Beketov (2011). *Ecotoxicology*, 21: 300-303.
25. Schäfer R.B., von der Ohe P.C., Rasmussen J., Kefford B.J., **Beketov M.A.**, Schulz R., Liess M., 2012. Thresholds for the effects of pesticides on invertebrate communities and leaf breakdown in stream ecosystems. *Environmental Science and Technology*, 46: 5134-5142.
24. Knillmann S., Stampfli N.C., Noskov Yu.A., **Beketov M.A.**, Liess M., 2012. Interspecific competition delays recovery of *Daphnia* spp. populations from pesticide stress. *Ecotoxicology*, 21: 1039-1049.
23. Knillmann S., Stampfli N.C., **Beketov M.A.**, Liess M., 2012. Intraspecific competition increases toxicant effects in outdoor pond microcosms. *Ecotoxicology*, 21: 1857-1866.

2011

22. Liess M., **Beketov M.A.**, 2011. Traits and stress - keys to identify community effects of low levels of toxicants in test systems. *Ecotoxicology*, 20(6): 1328-1340.
21. **Beketov M.A.**, Speranza A., Liess M., 2011. Ultraviolet radiation increases sensitivity to pesticides – synergistic effects on population growth rate of *Daphnia magna* at low concentrations. *Bulletin of Environmental Contamination and Toxicology*, 87(3): 231-237.
20. Stampfli N.C., Knillmann S., Liess M., **Beketov M.A.**, 2011. Environmental context determines community sensitivity of freshwater zooplankton to a pesticide. *Aquatic Toxicology*, 104(1-2): 116-124.

2010

19. Schletterer M., Füreder L., Kuzovlev V.V., **Beketov M.A.**, 2010. Testing the coherence of several macroinvertebrate indices and environmental factors in a large lowland river system, *Ecological Indicators*, 10(6): 1083-1092.
18. **Beketov M.A.**, Yurchenko Yu.A., Belevich O.E., Liess M., 2010. What environmental factors are important determinants of structure, species richness, and abundance of mosquito assemblages? *Journal of Medical Entomology*, 47(2): 129-139.

2009

17. **Beketov M.A.**, 2009. Rapoport effect is detected in a river system and based on nested organization. *Global Ecology and Biogeography*, 18(4): 498-506.
16. **Beketov M.A.**, 2009. SPEARpesticides pinpoints pollution in minutes. *TrAC - Trends in Analytical Chemistry*, 28(10): III-IV.
15. **Beketov M.A.**, Foit K., Schäfer R.B., Schriever C.A., Sacchi A., Capri E., Biggs J., Wells C., Liess M., 2009. SPEAR indicates pesticide effects in streams – comparative use of species- and family-level biomonitoring data. *Environmental Pollution*, 157(6): 1841-1848.

14. **Beketov M.A.**, 2009. Cross-Eurasian and altitudinal distribution of lotic mayflies – Species with wider altitudinal ranges have narrower geographical distribution. *Annales de Limnologie - International Journal of Limnology*, 45(4): 209-218.

2008

13. **Beketov M.A.**, Liess M., 2008. Variability of pesticide exposure in a stream mesocosm system: Macrophyte-dominated vs. non-vegetated sections. *Environmental Pollution*, 156(3): 1364-1367.
12. **Beketov M.A.**, Liess M., 2008. An indicator for effects of organic toxicants on lotic invertebrate communities: Independence of confounding environmental factors over an extensive river continuum. *Environmental Pollution*, 156(3): 980-987.
11. **Beketov M.A.**, Schäfer R.B., Marwitz A., Paschke A., Liess M., 2008. Long-term stream invertebrate community alterations induced by the insecticide thiacloprid: Effect concentrations and recovery dynamics. *Science of the Total Environment*, 405(1-3): 96-108.
10. **Beketov M.A.**, 2008. Community structure of Ephemeroptera in Siberian streams. *Entomological Science*, 11(3): 289-299.
9. **Beketov M.A.**, 2008. First data on caddisflies (Trichoptera) of streams of northern middle Siberia, Russia. *Entomological News*, 119(3): 299-302.
8. **Beketov M.A.**, Liess M., 2008. Potential of 11 pesticides to initiate downstream drift of stream macroinvertebrates. *Archives of Environmental Contamination and Toxicology*, 55(2): 247-253.
7. **Beketov M.A.**, Liess M., 2008. Acute and delayed effects of the neonicotinoid insecticide thiacloprid on seven freshwater arthropods. *Environmental Toxicology and Chemistry*, 27(2): 461-470.

2007

6. **Beketov M.A.**, Liess M., 2007. Predation risk perception and food scarcity induce alterations of life cycle traits of the mosquito *Culex pipiens*. *Ecological Entomology*, 32(4): 405-410.

2006

5. **Beketov M.A.**, Liess M., 2006. The influence of predation on the chronic response of *Artemia* sp. populations to a toxicant. *Journal of Applied Ecology*, 43(6): 1069-1074.

2005

4. **Beketov M.A.**, Liess M., 2005. Acute contamination with esfenvalerate and food limitation: chronic effects on the mayfly *Cloeon dipterum*. *Environmental Toxicology and Chemistry*, 24(5): 1281-1286.

2004

3. **Beketov M.A.**, 2004. Different sensitivity of mayflies (Insecta, Ephemeroptera) to ammonia, nitrite and nitrate: linkage between experimental and observational data. *Hydrobiologia*, 528(1-3): 209-216.
2. **Beketov M.A.**, 2004. Comparative sensitivity to insecticides deltamethrin and esfenvalerate of several aquatic insects (Ephemeroptera and Odonata) and *Daphnia magna*. *Russian Journal of Ecology*, 35(3): 200-204.

2002

1. **Beketov M.A.**, 2002. Ammonia toxicity to larvae of *Erythromma najas* (Hansemann), *Lestes sponsa* (Hansemann) and *Sympetrum flaveolum* (Linnaeus). *Odonatologica*, 31(3): 297-304.

Articles in peer-reviewed journals not covered by *ISI*:

9. **Beketov M.A.**, 2007. New records of mayflies and stoneflies (Ephemeroptera, Plecoptera) in South-West Siberia. *Euroasian Entomological Journal*, 6(4): 387-388.
8. **Beketov M.A.**, 2006. Caddisflies (Trichoptera) of south-western Siberia: new zoogeographical records, aquatic habitat preferences and flight periods. *Braueria*, 33: 13-16.
7. **Beketov M.A.**, Godunko R.J., 2005. *Baetis khakassikus* n. sp., a new species of the subgenus *Rhodobaetis* Jacob, 2003 from Middle Siberia, Russian Federation (Ephemeroptera: Baetidae: Baetis). *Genus*, 16(1): 7-12.
6. **Beketov M.A.**, 2005. Species composition of stream insects of northeastern Altai: mayflies, caddisflies, and stoneflies (Ephemeroptera, Trichoptera, Plecoptera). *Euroasian Entomological Journal*, 4(2): 101-105. – [Russian, with English abstract]
5. **Beketov M.A.**, Kryukov V.Yu., 2004. Caddisflies (Trichoptera) of Southern Trans-Ural region. *Euroasian Entomological Journal*, 3(3): 213-215. – [Russian, with English abstract]
4. **Beketov M.A.**, 2004. New data on mayflies (Ephemeroptera) of South-West Siberia. *Euroasian Entomological Journal*, 3(1): 25-27 – [Russian, with English abstract]
3. **Beketov M.A.**, Ivanov V.D., 2004. New data on the caddisflies (Trichoptera) of south-western Siberia. *Braueria*, 31: 26-28.
2. **Beketov M.A.**, 2004. Stoneflies of southwestern Siberia, Russia, with description of the larva of *Isoperla kozlovi* Zhiltzova, 1972 (Plecoptera). *Opuscula zoologica fluminensia*, 218: 1-8.
1. **Beketov M.A.**, Kluge N.Yu., 2003. Mayflies of Southwestern Siberia, Russia (Ephemeroptera). *Opuscula zoologica fluminensia*, 211: 1-6.

## Book chapter:

1. Von der Ohe P.C., Apitz S.E., Arbaciauskas K., **Beketov M.A.**, Borchardt D., de Zwart D., Goedkoop W., Hein M., Hellsten S., Hering D., Kefford B.J., Panov V.E., Schäfer R.B., Segner H., van Gils J., Vegter J.J., Wetzel M., Brack W. 2013. Status and Causal Pathway Assessments Supporting River Basin Management. In: *Risk-Informed Management of European River Basins*. Springer. 395 p.