

Ingrīda Puriņa Ph.D.

hidroekoloģija / *aquatic ecology*

LV

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Pastāstiet, lūdzu, kādā jomā strādājat.

Mēs visi esam sākuši ar aļģēm, bet šobrīd darām daudz vairāk. Īsi sakot, pētām visu, kas atrodas ūdenī. Pētām gan to, ko var saskatīt ar neapbruņotu aci ienirstot – makroskopiskās aļģes, piemēram, gan mikroskopā saskatāmo, gan dažādus procesus – barības ķēdes, viļņu iedarbību uz smiltīm, smilšu ietekmi uz organismiem. Viss apaug. Kad atnāk studenti un pamazām sāk kļūt par zinātnieku, viņš ķeras pie kaut kā viena. Pieaugot un saprotot, kā tas funkcionē dabā, pie tā vien nepaliek.

Ekotoksikoloģija jau ir brutālāks žanrs. Tā nodarbojas ar piesārņojuma un tā ietekmes pētīšanu. Organismi ir pirmie, kas reaģē. Ja ūdenī kas noticis, mēs to pamanām tikai, kad organismi atmirst jau lielos daudzumos. Lai uzzinātu, kas notiek ātrāk, jāņem talkā ekotoksikoloģija. Mēs cenšamies ātrāk noskaidrot, kā organismi reaģē, lai nenākas secināt, ka nu ir viss – pēdējais nomiris. Kad cilvēks saka: “Fui, smird!”, tad jau ir beigas.

Bērnībā ar tēti dzīvojām Duntē pie jūras, un tolaik bija ļoti netīrs ūdens. Visur lika zīmes “Peldēties aizliegts”. Tad domāju, cik labi būtu darīt kaut ko, lai atkal drīkstētu peldēties. Nezinu, vai tālākais ir nejausība. Beigās saproti, ka tas patīk un

Could you please describe the broader field of your research?

We all started out with algae, but currently we're doing much more. In brief, we study everything in the water. We study the stuff that you can see with the naked eye when you take a dip: for example, macroscopic algae. Then there's the stuff you can see under a microscope, along with various processes – food chains, the impact of waves on sand and the impact of sand on organisms. Everything grows. When a student arrives and gradually becomes a scientist, he focuses on one particular subject. As he matures and understands how it functions in nature, the one thing is no longer enough.

Ecotoxicology is a more brutal genre. It involves researching pollution and its impact. Organisms are the first to react. If something has happened in the water, we only notice it when organisms are dying in large numbers. To find out what's happening faster, you have to draw on ecotoxicology. We try to ascertain as quickly as possible how organisms react so that we don't end up concluding that it's a case of: game over - the last one has died. When people say, "Phew, it stinks!"; the end is nigh.

During my childhood, we lived with

ir romantiski. Mums ir lielas cīņas par to, kurš varēs braukt jūrā ekspedīcijā. Katrs domā pētījumus, lai tiktu reisā. Romantika un plašums nav mazsvarīgs. Ezers nekad nav šķitis tik interesants, jo tam ir krasti, redzamas robežas. Iebraucot jūrā, saproti, ka cilvēks nav pārāks.

Pie kā strādājat šobrīd?

Nu jau varam tekt, ka tie ir ekosistēmas pētījumi. Tas, kāpēc mēs šobrīd varam eksistēt, ir gaiss. To radījušas aļģes. Tas, ko mēs šobrīd saprotam ar fitoplanktonu, ir unikāls organisms, kas atbildīgs par tik daudz lietām. Tie ir pirmie fotosintezējošie organismi, kas radušies uz Zemes pirms divarpus miljardiem gadu. Aļģes ūdenī un augi uz sauszemes ir vienīgais, kas saista Saules enerģiju bioloģiski. Kad Zeme bija jauna, to darīja tikai zilaļģes. Ar Saules enerģijas palīdzību tiek saistīts ogleklis un pārvērsti organiskās vielās, tas notiek bioloģiski.

Kā jūsu darbs attiecas uz pārējiem, ar zinātņi nesaistītajiem cilvēkiem?

Dažkārt projekts paredz sabiedrības informēšanu. Tad ejam uz radio, stāstām par toksīniem mūsu ezeru zivīs. Un tas droši vien ir svarīgi. Lai sabiedrība zina,

my dad in Dunte by the sea and, at that time, the water was very dirty. There were "No Swimming" signs erected everywhere. Then I thought to myself how good it would be to do something so that we were once again allowed to go swimming. I don't know if what followed is a coincidence. In the end you understand that you enjoy it and that it's romantic. We have big fights about who's going to take part in a maritime expedition. Each of us thinks up studies just so that we can get to go on the expedition. The romance and wide open space matter. Lakes have never struck me as being as interesting, because they have shores and visible boundaries. When you venture out onto the sea, you understand the man is not superior.

What are you currently working on?

By now we can already describe it as ecosystem studies. The reason what we can currently exist is because of air. It was created by algae. The thing that we currently know to be phytoplankton is a unique organism, which is responsible for such a lot of things. These are the first photosynthesising organisms that were created on Earth two and half billion years ago. Algae in water and plants on dry land are the only things that har-

ko mēs darām, ka neesam vienkārši cilvēki baltos ķitelīšos, kas laboratorijās notērē nodokļu maksātāju naudu. Un zivīs tiešām ir tie toksīni, jāuzmanās. Vari jau teikt, ka visu mūžu esi ēdis zivis, bet nekas nav noticis. Bet, kad kaislīgs makšķernieks nomirst ar aknu cirozi, vai kāds analizē, vai viņa aknās ir zilaļģu toksīni? Parasti pieņem, ka viņš, kā jau makšķernieks, mīlējis uz ezera iemest. Un tā gadījās.

Tomēr lielākoties projektos, no kuriem atkarīga mūsu darbība, nav iekļauta saziņa ar publiku. Mums vajadzētu blogeri. Pēc statistikas, piemēram, par klimata izmaiņu izpratni sabiedrībā, Latvijai ir vāji rādītāji. Aptaujātie uzskata, ka tas neatbilst patiesībai. Kāda globālā sasilšana, ja mums ir tik auksts pavasaris? Senāk taču maijā bija silti. Bet tā jau nav, klimata izmaiņas raksturo neprognozējamība un izteikts svārstīgums.

Kādas, jūsuprāt, ir attiecības starp analītiskām, racionālām spējām un intuīciju, radošu darbu zinātnē?

Zinātnē grūti ir tas, ka nekad nezini, vai kaut kas iznāks. Tagad zinātne tiek iedzīta rāmjos. Rakstot projektu, ir jāzina tā rezultāts. Vai to varēs kādam pārdot. Visam jābūt prognozējamam. Tomēr

ness solar energy biologically. When the Earth was new, this was exclusively done by cyanobacteria. With the help of solar energy, carbon is harnessed and transformed into organic substances. This takes place biologically.

How does your work relate to people who are not involved in the scientific community?

Sometimes, a project requires that the public should be informed. Then we are interviewed on the radio and talk about the toxins in the fish in our lakes. And most likely this is important. So that the public knows what we do; that we're not just people in white coats, who spend taxpayers' money in laboratories. And the fish really do contain these toxins, so you have to be careful. Of course, you can say that you've eaten fish all your life and that nothing has ever happened. But when a passionate angler dies of cirrhosis of the liver, does anybody bother to conduct an analysis to test whether his liver contains cyanobacteria toxins? Usually, it's just assumed that being an angler, he enjoyed having a drink on the lake. And this is supposed to explain it.

However, for the most part, in projects, which our work is dependent on,

man šķiet, zinātne rodas starplaikos. Kad aizraujies ar kaut ko, kas varbūt pat nav īsti apmaksāts, bet rodas idejas. Ejot uz projektā paredzēto rezultātu, kas jāsasniedz, lai saņemtu finansējumu, pa ceļam rodas vēl citi rezultāti. Kad Alūksnes ezerā parādās mistiskā aļģe un par to sūdzas vietējie iedzīvotāji. Ezers kļūstot riebīgs un tajā peld kaut kādas bumbiņas. Ja nevarētu ar aci saskatīt, viss būtu labi, bet tagad jāsauc paļīgā zinātnieki. Izrādās, atkal mūsu mīļotās zilaļģes, tikai neredzētā veidā. Pētot atklājas, ka tās vairāk dzīvo pa sedimentiem un tikai noteiktos apstākļos paceļas augstāk, no dubļiem paņemot līdzi, teiksim, fosforu. Tad tās no gaisa piesaista slāpekli un nomirstot abus atstāj ūdenī. Tad lieta kļūst sarežģīta. Bet ir interesanti. Vajadzīgs entuziasms. Ja nav zinātkāres, tad nevar strādāt.

Sistemātiskā darba arī ir daudz, varētu gan vēl vairāk. Brīžiem šķiet, ka pārāk impulsīvi ar visu aizraujamies. Piemēram, lai eksperimentu varētu atkārtot, viss sīki jādokumentē. Paraugu apstrāde, datu interpretācija. Tas viss jādara, bet "uzķērušās" mēs laikam esam uz lauka darba. Gadās jau darbi kā jūras telpiskā plānošana, kur rocies tikai literatūrā. Bet arī tur atrodas interesantais.

there is no communication with the public. We could do with a blogger. For example, statistics show that public understanding in Latvia of climate change is low. Those surveyed believe that it is not true. What sort of global warming are you talking about if we're experiencing such a cold spring? Back in the day, it used to be warm in May. But this is not how it works; climate changes are characterised by unpredictability and marked fluctuations.

What are your views on the role of analytical, rational capacities and intuition, creativity in scientific research?

The difficult thing in science is that you never know whether you'll get a result. Right now, science is being confined within a framework. In writing a project, you have to know the outcome. Whether you'll be able to sell it to somebody. Everything must be predictable. However, it seems to me that science is born in between fields. When you're passionate about something that is maybe not even properly remunerated, but where ideas are generated. Proceeding towards the result envisaged in a project, which has to be achieved in order to receive financing, other results are generated along the way. Like when a mysterious alga ap-

Kā jūsu zinātniskā izglītība un darbs ietekmē jūsu pasaules uztveri?

Bioķīmijas lekcijā mums reiz rādīja paglaga izmēra grafiku ar visām ķīmiskajām reakcijām, kas notiek vienā pašā šūnā. Tad pasaki, kā tas viss varēja rasties nejaušības rezultātā? Tas nevar rasties, vienkārši sakratoties kopā trīs aminoskābēm. Es domāju, tam pamatā ir dziļš nodoms. Zeme ir iekārtota gudri un pārdomāti.

Kāda ir dzīves jēga?

O. Es teiktu, ka cilvēkam ir jāmeklē un jādara tas, kas patīk. Tāpēc arī studentiem nesaku, ka noteikti jāpaliek šeit. Svarīgi ir ar prieku darīt to, kas patīk. Zinātnieka laime būtu pilnā slodzē, vienā projektā ar neierobežotiem līdzekļiem darīt to, kas patīk. Un rezultāts būtu nevis gaidītais, bet atklājums.

Mēs vienmēr sakām: "Laižam kaut kur forši!" Ja te ir forši, tad mēs to jēgu piepildām.

pears in Lake Alūksne and local residents complain about it. The lake is becoming horrible and some kind of balls are floating on it. If you couldn't see this with the naked eye, everything would be fine, but now we call in some scientists to help. It turns out that once again these are our beloved cyanobacteria, but in a previously unseen form. Research reveals that they tend to be present in sediment and only rise higher under certain circumstances, bringing up, let's say, phosphorus with them. Then they attract nitrogen from the air and when they die, both remain in the water. Then the matter becomes complicated. But interesting. You need enthusiasm. You can't work if you don't have curiosity.

We also do a lot of systematic work, but we could do more. Sometimes, it seems like we get hooked on stuff a bit too impulsively. For example, in order to repeat an experiment, everything must be documented in detail. Sample processing, data interpretation. It all needs to be done, but it seems like our passion is field work. You do get jobs like maritime spatial planning, which exclusively involves digging into literature. But even there, you find something interesting.

How has your scientific education and work affected the way you look at the world?

Once in a biochemistry lecture, we were shown a bed sheet-sized graph showing all the chemical reactions, which take place in a single cell. Are you going to tell me that that could have all occurred by chance? It cannot occur by simply shaking three amino acids together. I think that there is a profound intention behind it. The Earth is arranged in a wise and considered manner.

What is the meaning of life?

Oh. I'd say people have to seek out and do what they enjoy. That's why I don't tell my students that they definitely have to stay here. It is important that you do that which you enjoy doing happily. For a scientist, happiness lies in a full workload; in a single project with unlimited funds to do what you enjoy doing. And the result would not be that which we expect, but a revelation.

We always say, "Let's go somewhere nice!" If it's nice here, then we are fulfilling that meaning.

Viena no 12 intervijām, kas tapušas, vācot materiālu Annas Salmanes, Kriša Salmaņa un Kristapa Pētersona skaņdarbam "Etīde" (2016).

One of twelve interviews that were conducted during the research for the sound piece "Study" (2016) by Anna Salmane, Krišs Salmanis and Kristaps Pētersons.

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Paldies! / *Thank you!*