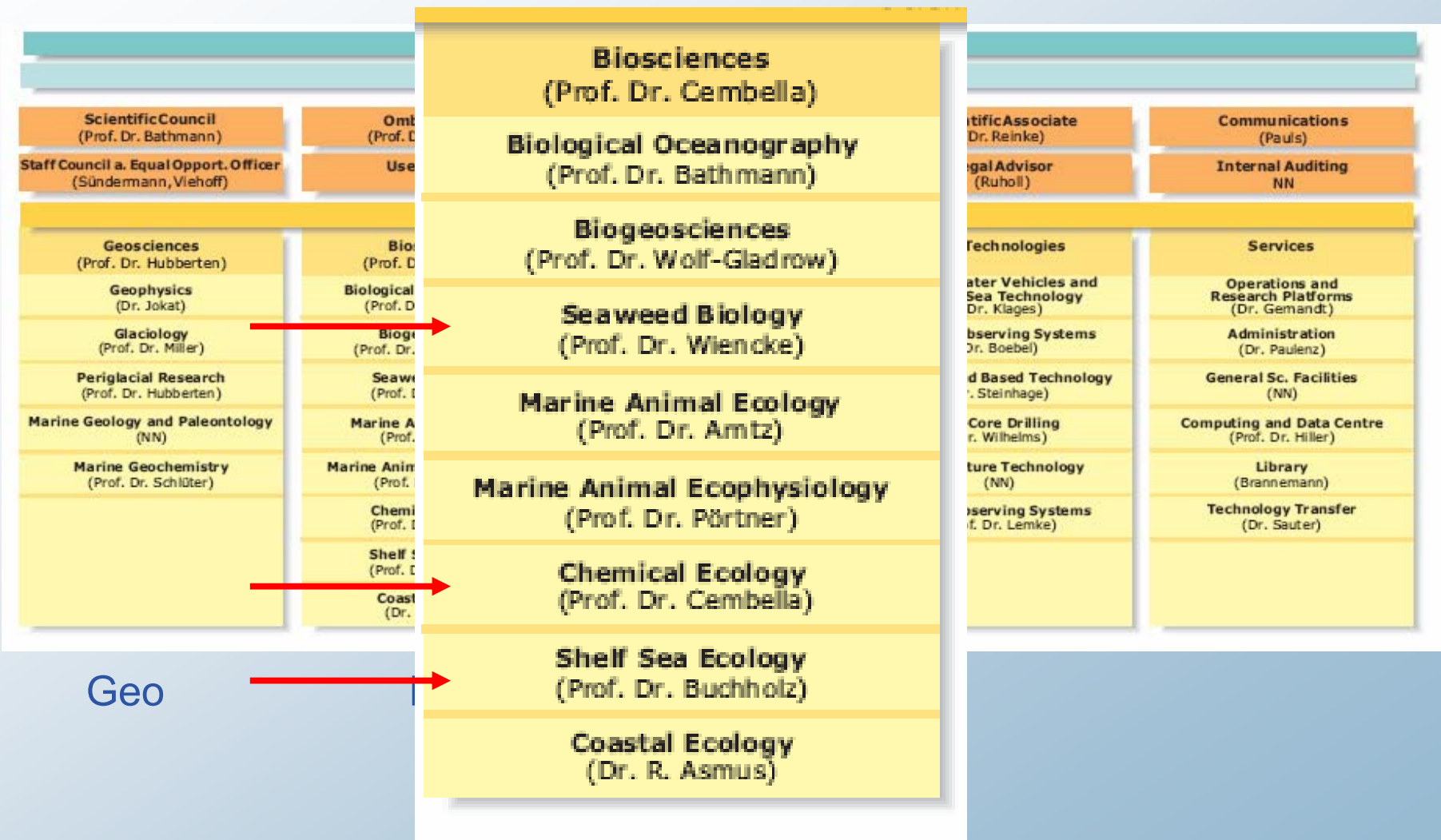


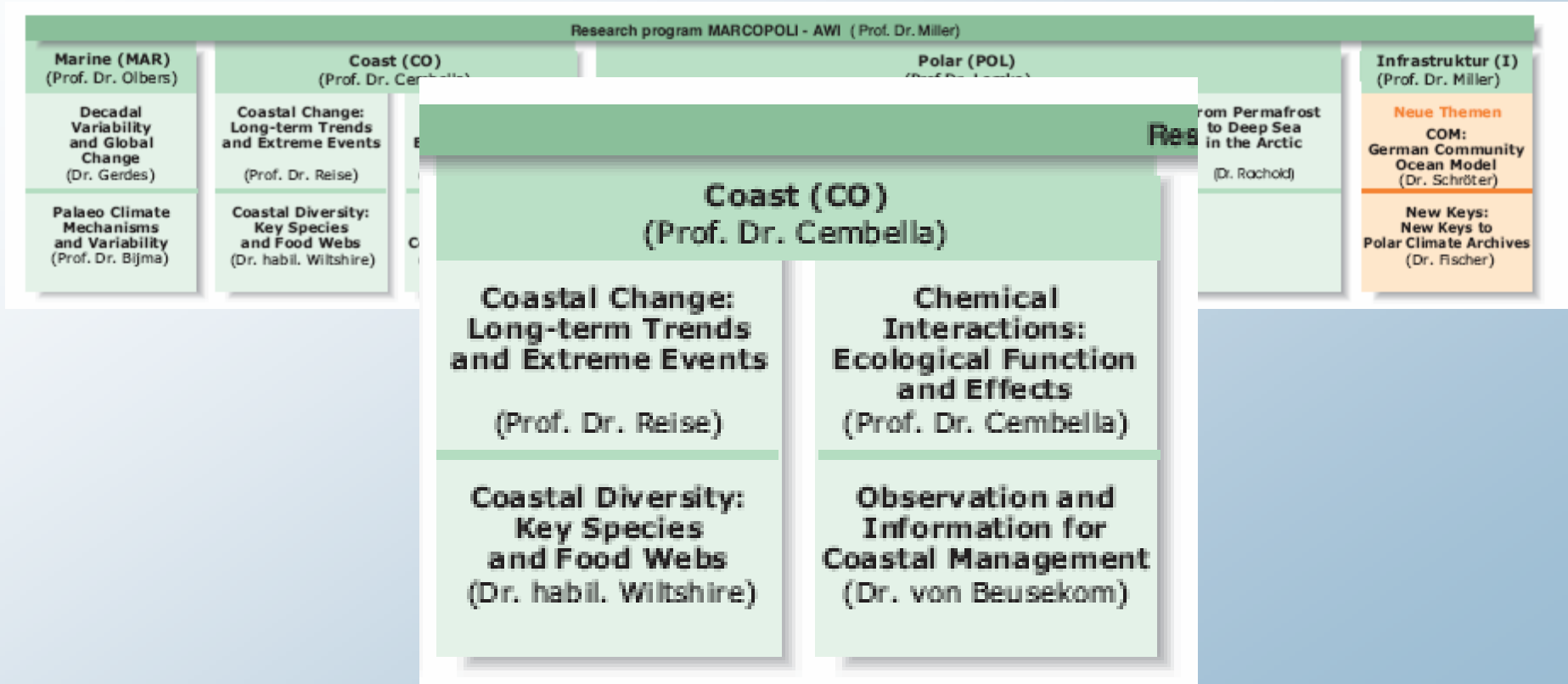
Research on chemical ecology in the Alfred-Wegener Institut for Polar- and Marine Research



Structure of the Institute:



Structure of the Institute:



Structure of CO3

* Chemical Ecology

- ↗ Influence of toxicants on Marine mammals (GKSS)
 - Immunological responses
- ↗ Toxicity in Jellyfish (GKSS/AWI)
 - Structure of substances, producers
- ↗ Flatfish and their environment (AWI/GKSS)
 - Origin of tumors, indicators of stress
- ↗ Marine protists and their signalling substances (AWI)

Marine protists

*Main questions:

↗ Who produces the substances?

▪ Genotyping, phenotyping

↗ Why are these substances produced?

↗ Communication, allelopathy, grazing resistance

↗ When

↗ Environmental conditions

↗ How

↗ Molecular mechanisms

The Chemical Ecology Approach – identification, characterisation, quantification of bioactive secondary metabolites from marine plankton and determination of the ecological function

Functional Ecology

- **Controlling factors** (biological, environmental, genetic)
- **Inter- and intraspecific variability**
- **Responses** of target organisms (evolutionary, behavioural)
- **Effects on population dynamics:** Inter-algal and grazer interactions
- **Effects on planktonic food webs**

WHY/WHEN

Chemistry & Physiology

- **Bioassay-guided fractionation** to chemically characterise secondary metabolites
- **Analytical techniques** to identify & quantify secondary metabolites
- **Biosensors** to clarify **mode of action** and **specific receptors**

WHAT

Functional Genomics & Gene Expression

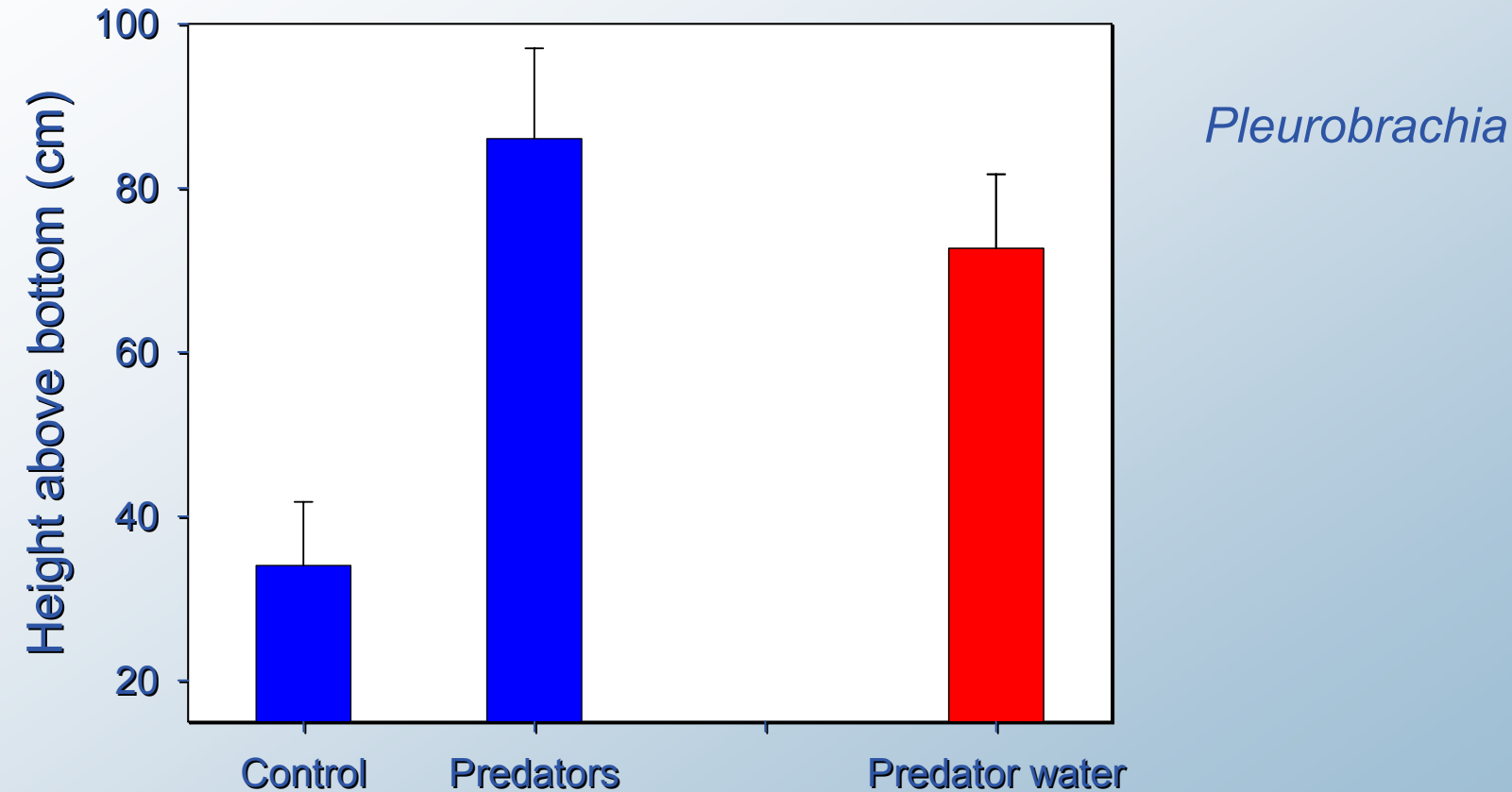
- **cDNA and EST libraries** for genetic screening
- Identification and characterization of **toxin-specific genes**
- **Microarrays** for gene expression
- **Molecular probes** for species characterization

HOW

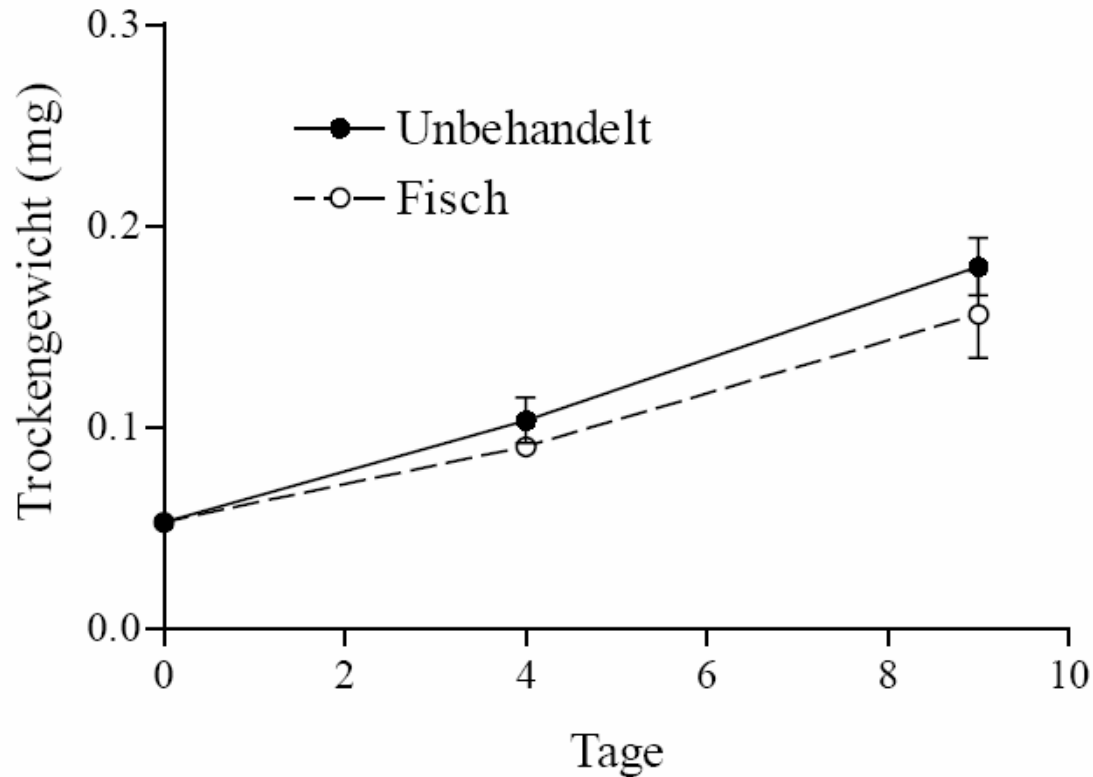
Chemical interactions outside CO₃

- * Ecological relationships
- * Feeding relationships

Kairomones, or other chemical interactions



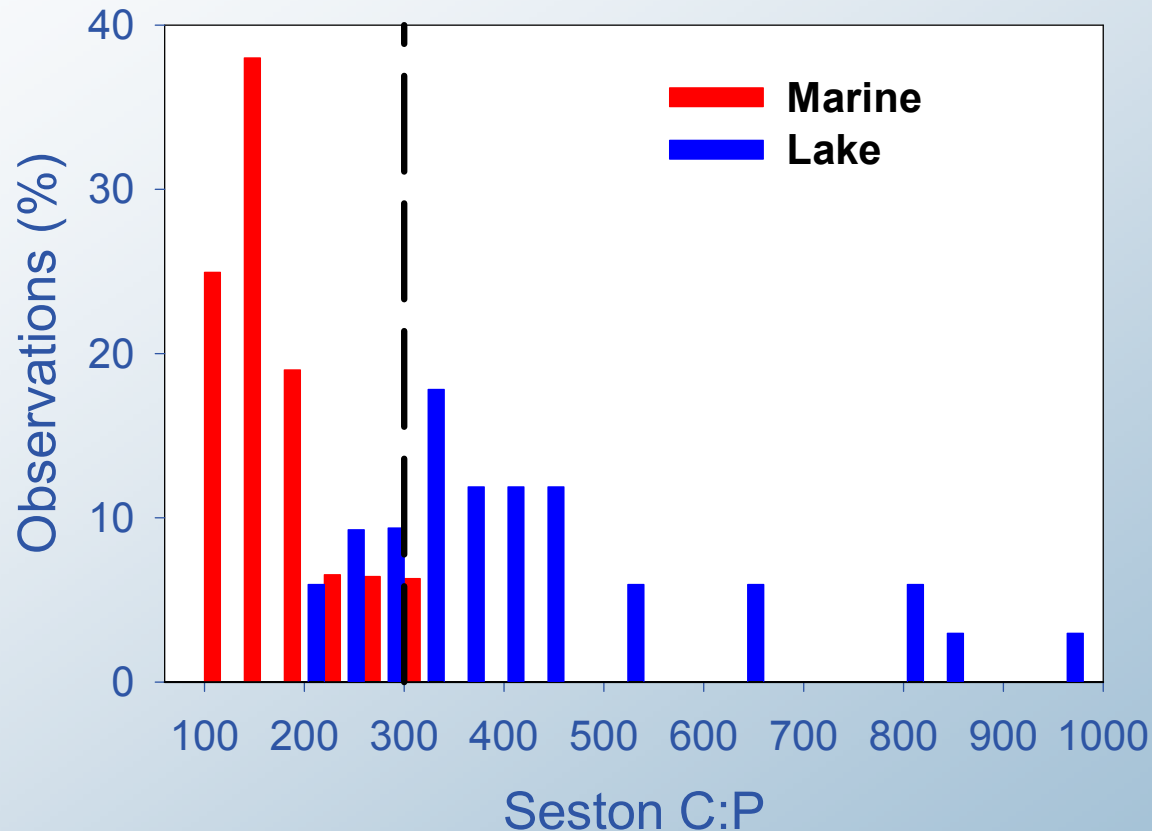
Kairomones, or other chemical interactions



Feeding:

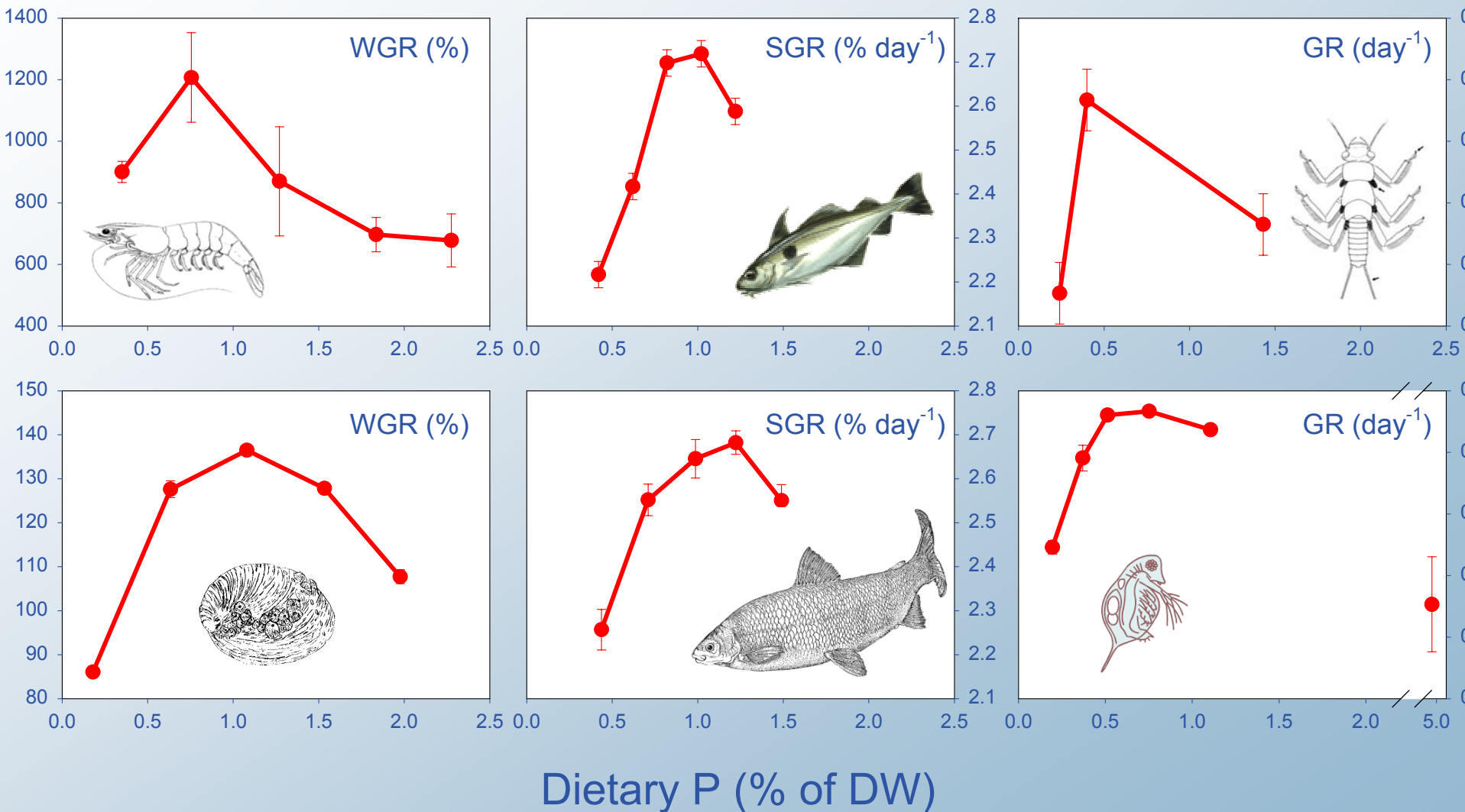
- * Not only directly toxic substances, also others influence flow of energy and matter:
 - ↗ Nutrients such as N, P
 - ↗ Biochemical compounds: fatty acids, amino acids
 - ↗ Macronutrients: proteins, carbohydrates
- * Important: the ratio between different substances is often just as important as the absolute amounts

The case of phosphorus and carbon



(after Elser & Hassett 1994)

The effect of high P-levels in food



Thanks

