

The 2-MIB and Geosmin Taste and Odour Issue

Dr Rupert Perkins

Senior Lecturer, Cardiff University

Dr Phillippa Pearson, Thomaz Andrade

and many others in the DCWW Catchment Team



Outline

1. What's the problem?
2. Welsh Water 2050
3. What have we done so far?
4. What do we need to solve the problem?

Whats the problem?

2-Methylisoborneol (MIB) and Geosmin: Musty and Earthy taste and odour – customer complaints

Customers can detect at 5-10 ng/l

Costly treatment (PAC/GAC etc.)



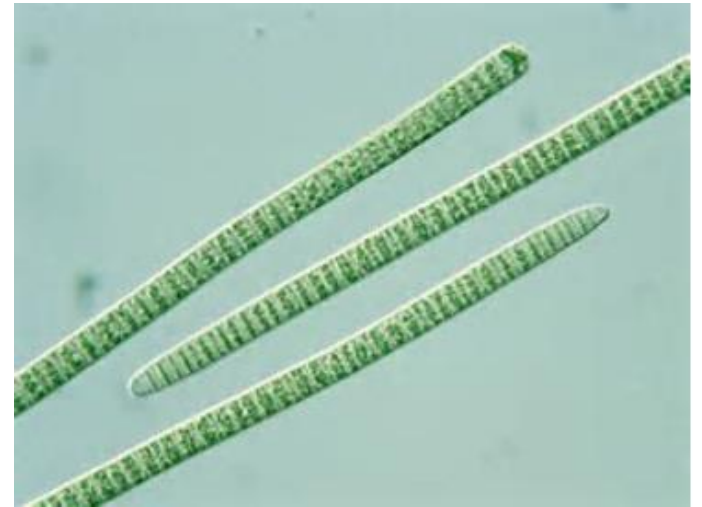
Welsh Water 2050

- Ambition: customers no longer detect adverse taste and odours
- Climate change challenge

We know the producers:
cyanobacteria, actinomycetes.....

Why? Compounds used to make
pigments, sterols etc.

When? During rapid growth, when
conditions are optimal – especially
nutrients





Dŵr Cymru
Welsh Water



- What have we doing?**
Catchment Investigations:
- Sub-Catchment Sampling
 - Weather Monitoring
 - 3D Reservoir Modelling

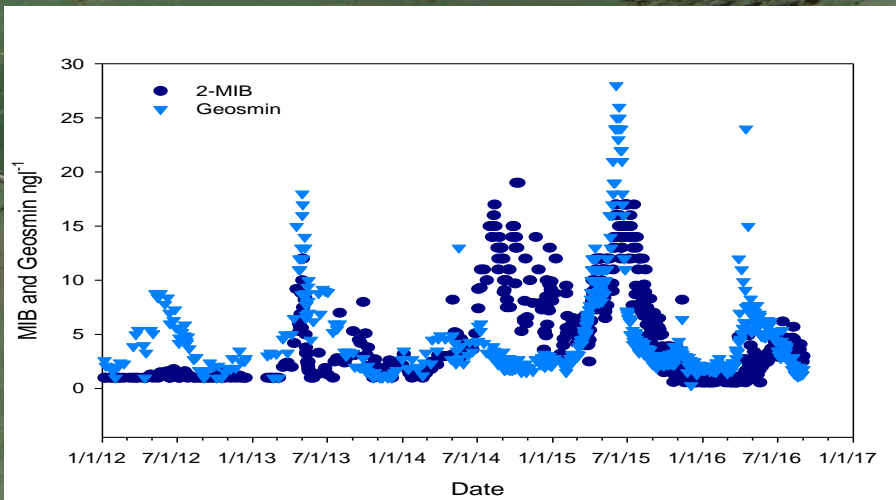
NERC SCIENCE OF THE ENVIRONMENT

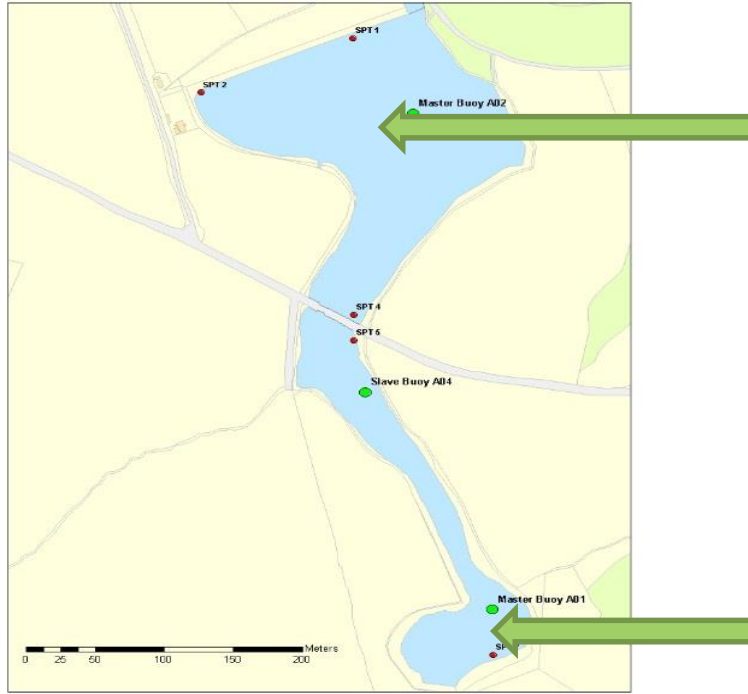
CARDIFF UNIVERSITY
PRIFYSGOL CAERDYDD

solid living changing

EARTH OCEAN

An example:
Plas Uchaf/ Dolwen in
2015 compared to 2016

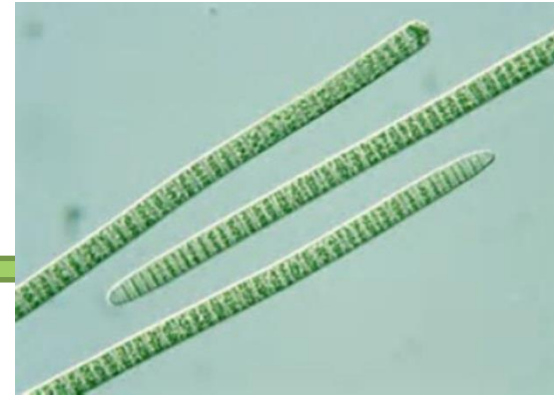




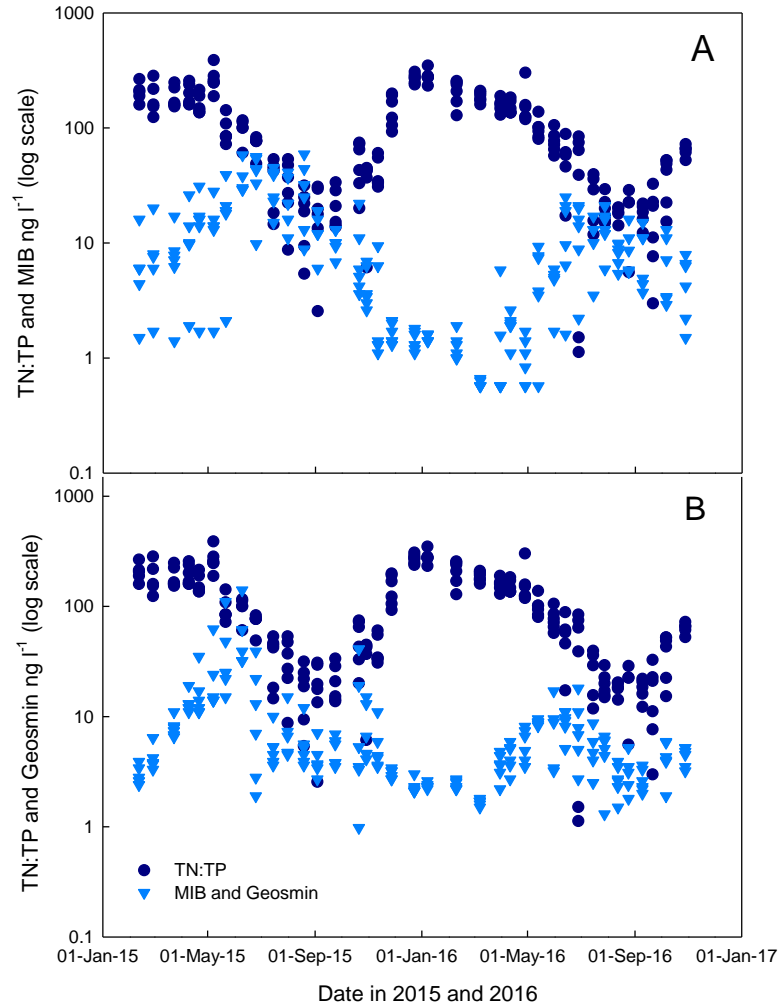
Geosmin



MIB and Geosmin

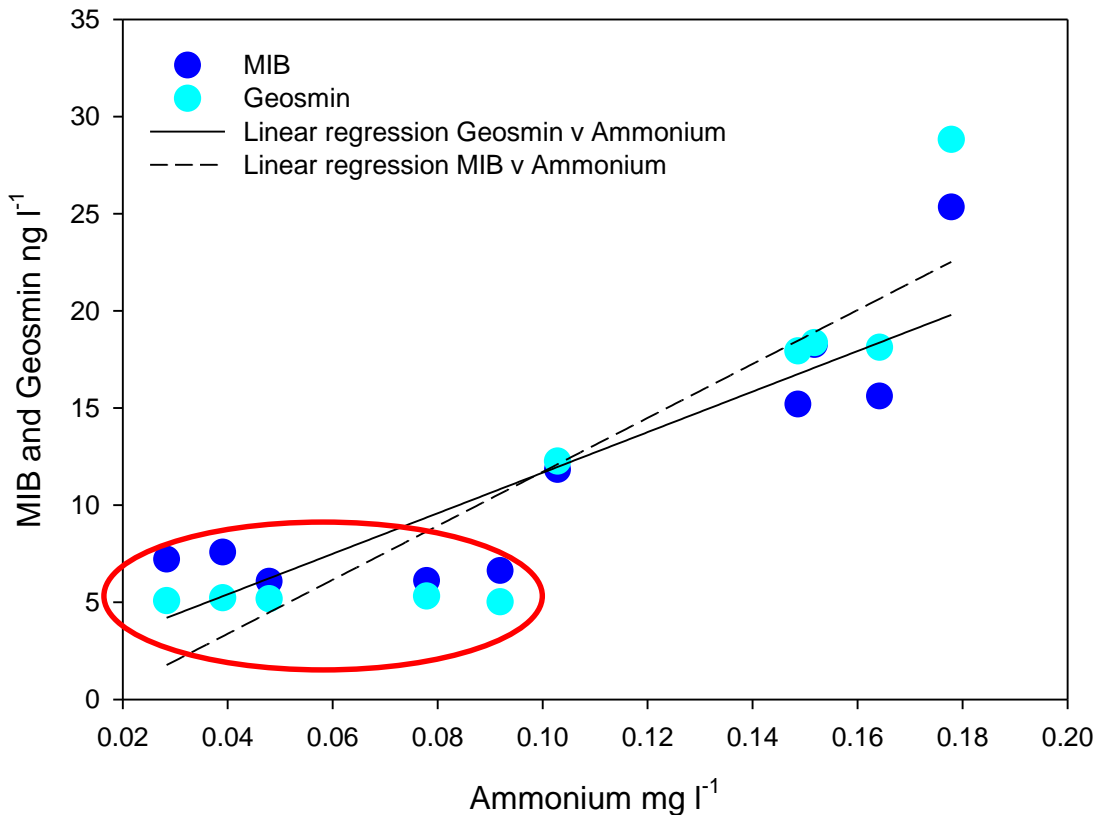


An inverse relationship of MIB and Geosmin with nutrient ratios

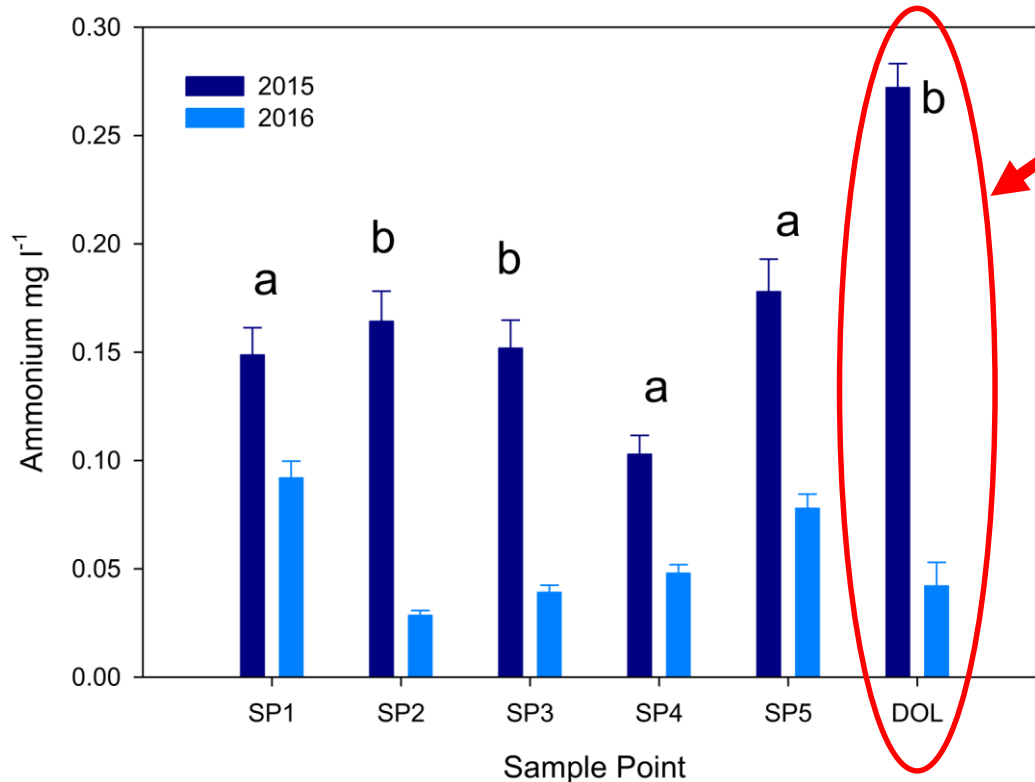


Pinpointing the trigger(s)

The trigger is the ammonium, how much and when, but where from?



Changes in Ammonium within the reservoir between 2015 and 2016



The Source,
a small surface
flow from Dolwen
in to Plas



Established the UK Water Industry Taste and Odour Working Group

- Sharing of data and information
- Developing shared catchment sampling approach

So what do we know?

- ◆ Typical source – filamentous cyanobacteria
- ◆ Nutrients (relative abundance) are the triggers
- ◆ Production correlates with productivity and not biomass / cell or colony counts
- ◆ Time lag between production and detection (rapid growth – senescence)
- ◆ Raw water data (at abstraction) won't detect the producers / or causes

What do we need to do to solve the problem?

- ◆ Prove the theory – measure the nutrients and the geosmin and MIB production (causation not correlation)
- ◆ Apply to a wide range of reservoirs (determine the full range of triggers)
- ◆ Develop early warning systems (e.g. on site monitors)
- ◆ To achieve Welsh Water 2050 plan; determine catchment management intervention for prevention