

# Diversity and importance of filamentous bacteria in BNR wastewater treatment plants – a worldwide survey



mni@bio.aau.dk

Marta Nierychlo, Simon Mclroy, Anja Sloth Ziegler, Aaron Saunders, Mads Albertsen, Søren M. Karst, Mikkel Stokholm-Bjerregaard, Per H. Nielsen  
Center for Microbial Communities, Aalborg University, Denmark

## Introduction

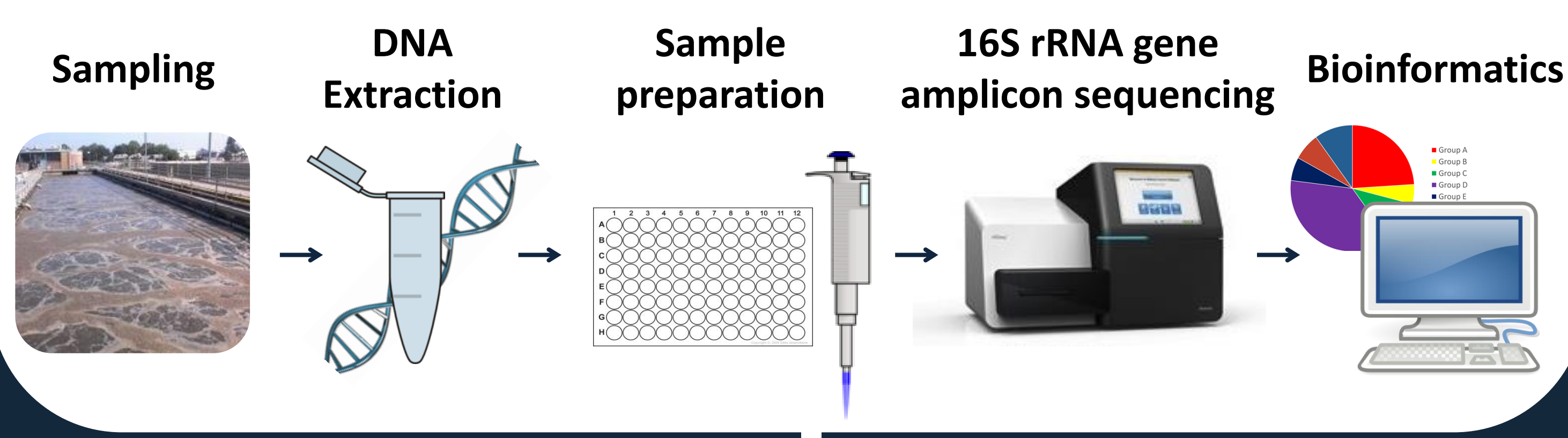
Filamentous bacteria are commonly present in wastewater treatment plants (WWTPs) worldwide where they are thought to play an important role by providing structural backbone for activated sludge flocs and thus ensuring good settling properties. However, their excessive growth into the bulk liquid may lead to inter-floc bridging, which interferes with floc settleability, causing bulking or results in foaming incidents. This phenomenon is dependent on the type and abundance of the filaments present, thus it is important to know the composition of filamentous community in activated sludge systems in order to be able to select and apply adequate control measures.

## Objectives

- investigate the diversity and abundance of all filamentous bacteria in full-scale nutrient removal WWTPs around the globe
- identify filamentous bacteria responsible for bulking and foaming problems

## Methods

30 worldwide & 24 Danish EBPR WWTPs



## Conclusions

Diversity of abundant filamentous bacteria in activated sludge community around the globe is limited. Control strategies are currently available for a number of filaments; identification and characterization of all the abundant globally present filamentous bacteria is an important step for the development of suitable control measures for all the bulking and foaming bacteria.

## Results

Filamentous community over the world is dominated by *Candidatus* Microthrix and members of phylum Chloroflexi

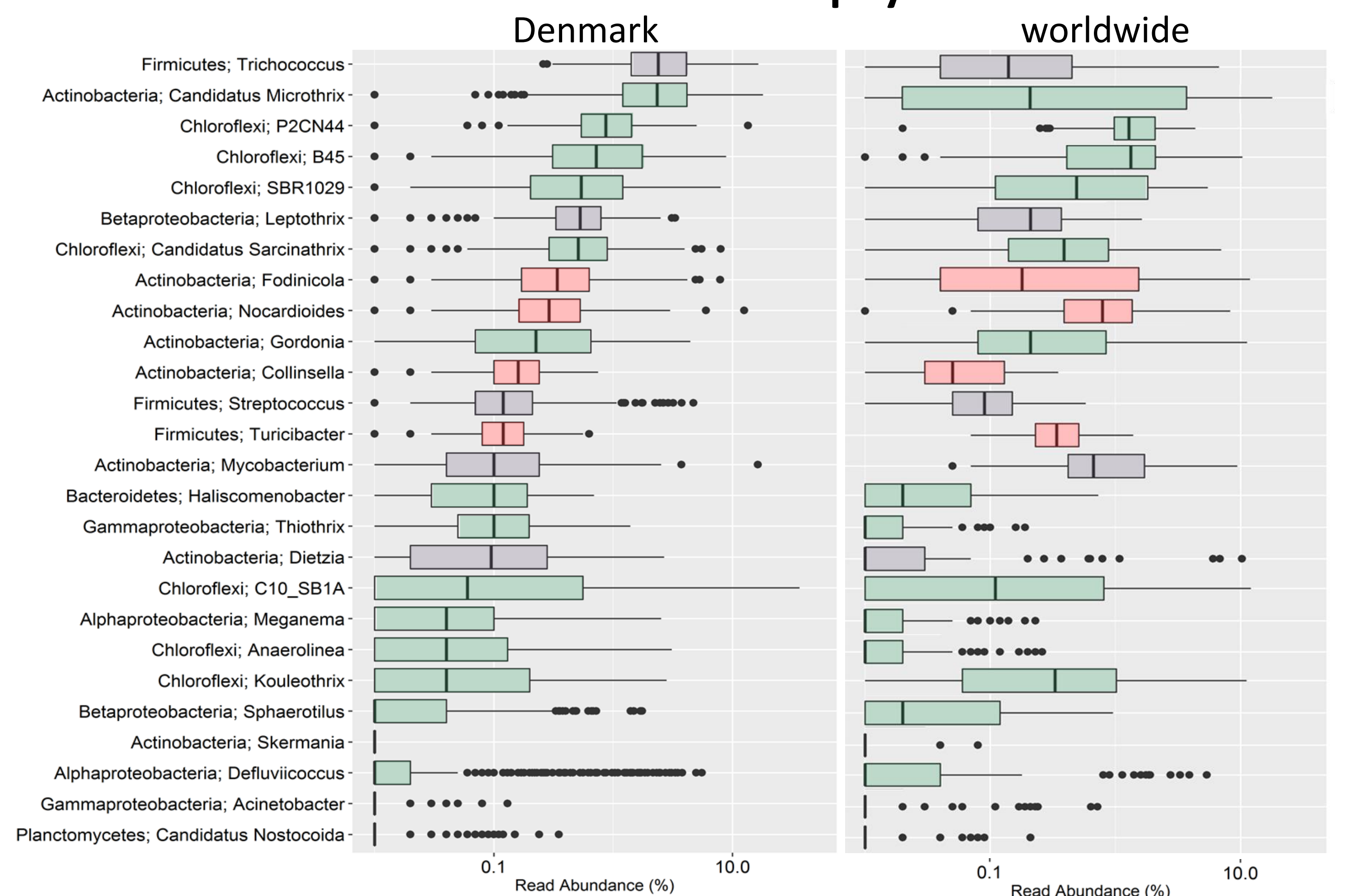


Figure 1. Distribution of filamentous genera in 24 Danish and 30 worldwide full-scale WWTPs (average across the plants).

Diversity of the problematic *Candidatus* Microthrix causing settling problems is very limited worldwide

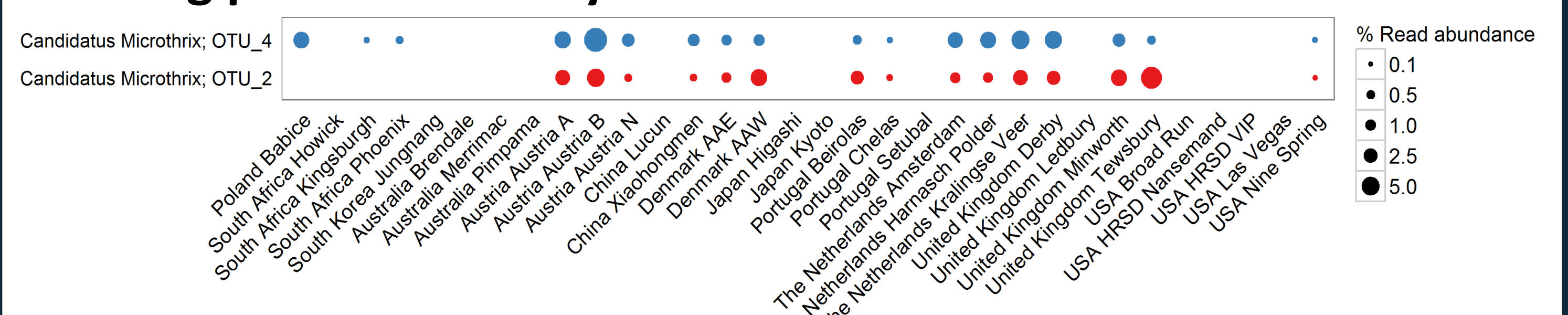


Figure 2. Diversity of *Candidatus* Microthrix in 24 Danish full-scale plants.

Previously unknown Chloroflexi C10\_SB1A was identified in several plants as the main reason for the observed bulking episodes

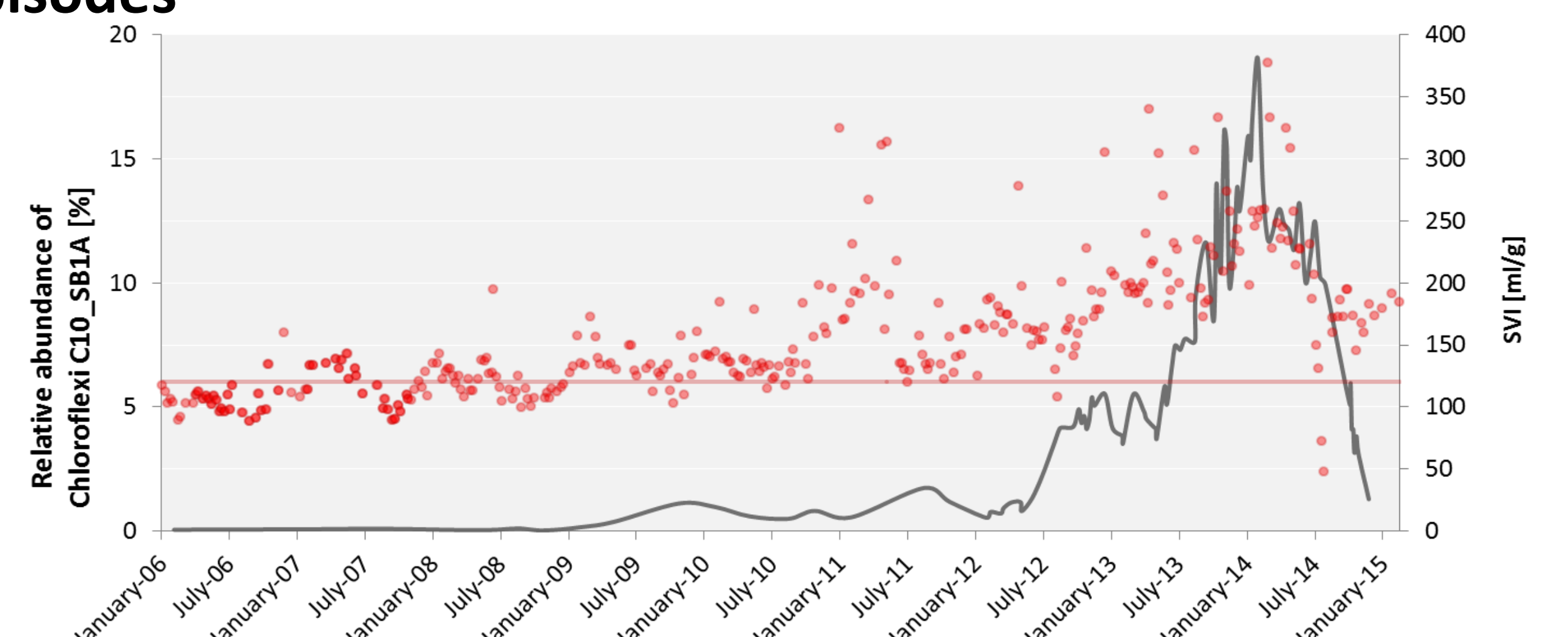


Figure 3. Sludge volume index (SVI) and the relative abundance of recently identified Chloroflexi C10\_SB1A in a Danish WWTP