SAG Culture Collection of Algae: a platform for *ex situ* conservation of algal biodiversity and research

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SAG - Culture Collection of Algae at
University of Göttingen, Germany

SAG: Biological Resource Centre for Algae

- *Ex situ*-maintenance of living cyanobacterial and algal strains
- provision of quality source material for research, teaching, ecotoxtesting and biotechnology
- isolation and deposition of new strains
- research
- teaching

The **SAG** originates from the collection started by

E. G. Pringsheim

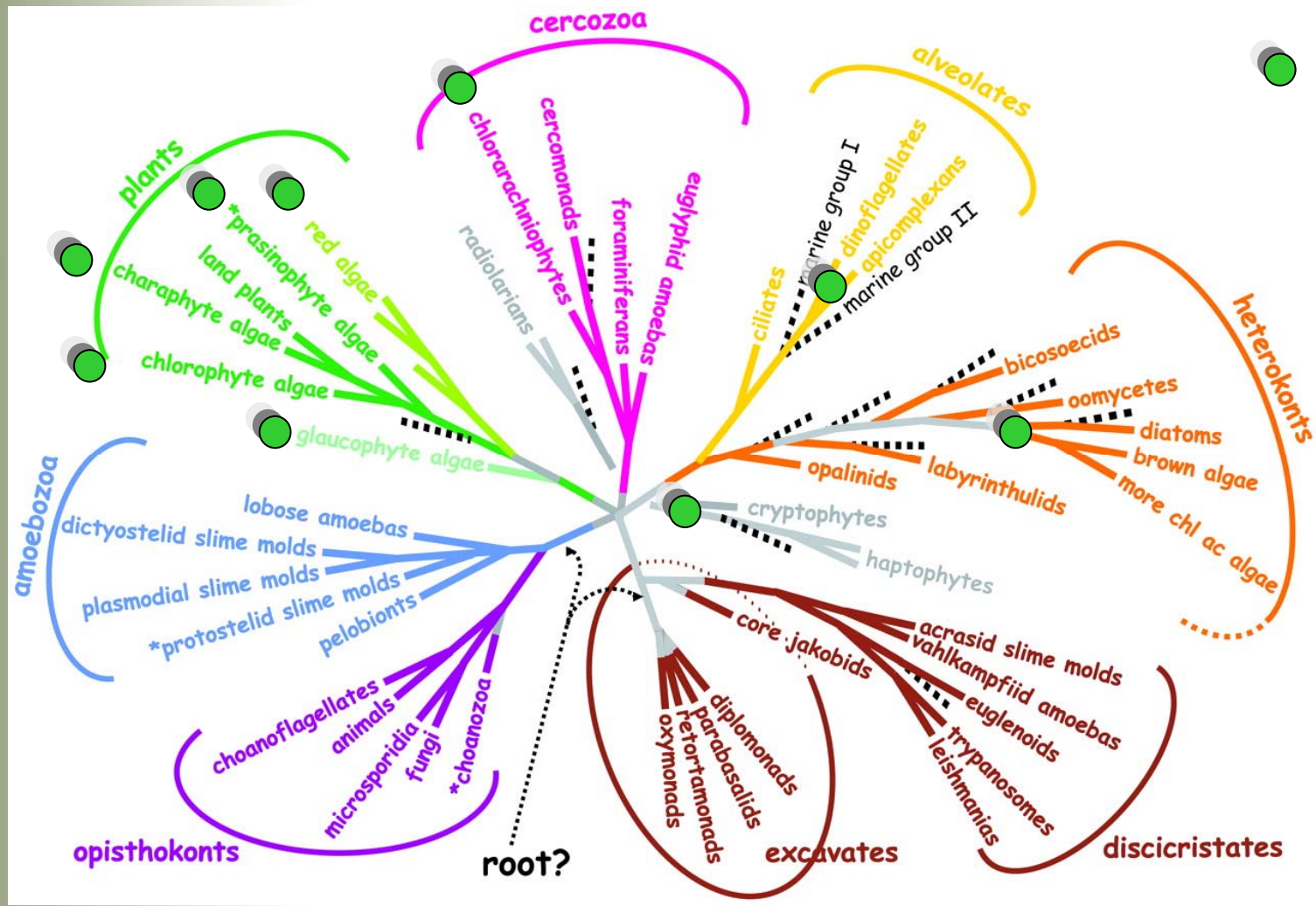
in Prague in the early 1920's

E. G. Pringsheim
(1881 - 1970)

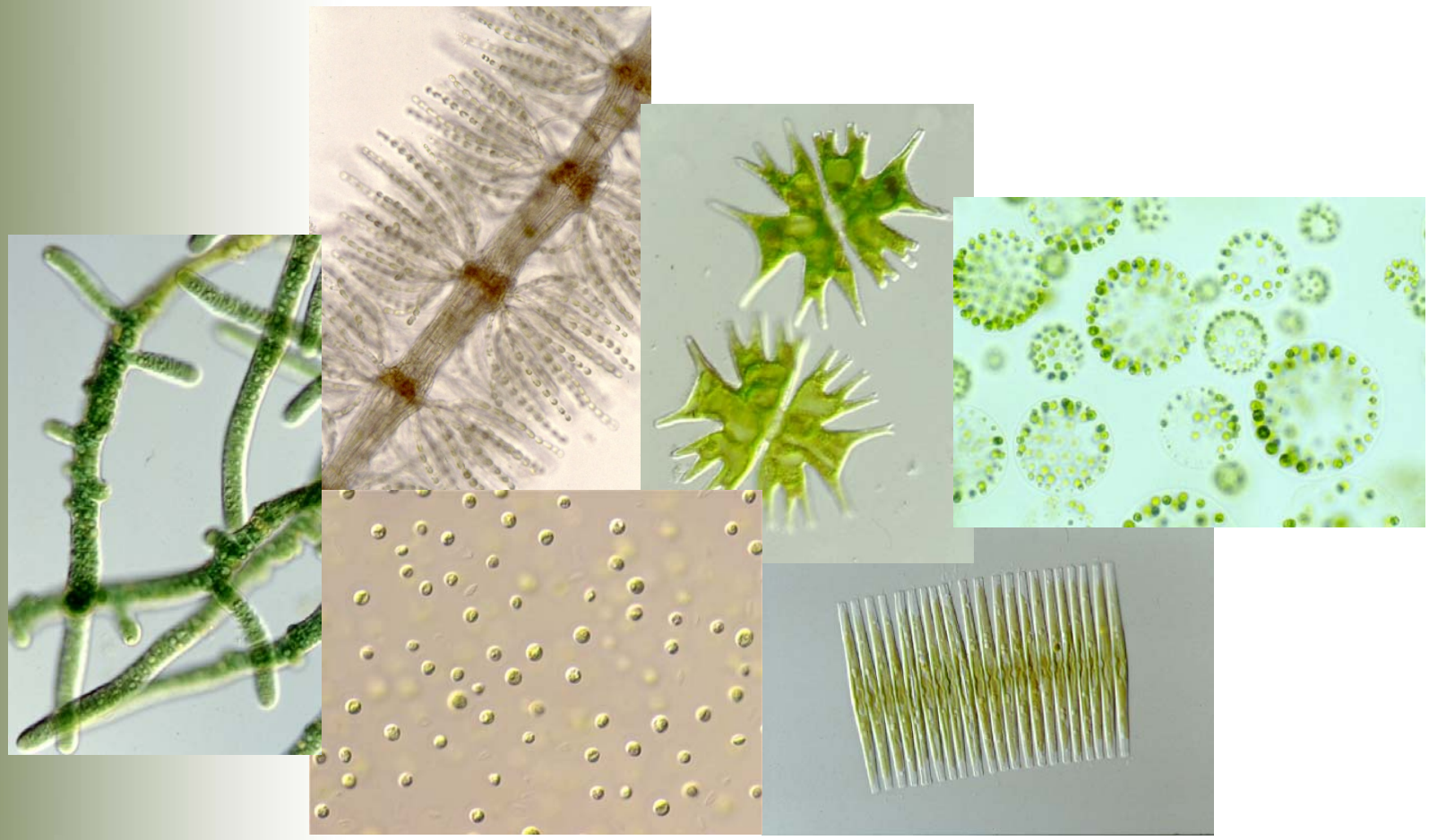
Pringsheim´s living legacy:

313 strains still available (56 authentic)

Algae are extremely diverse



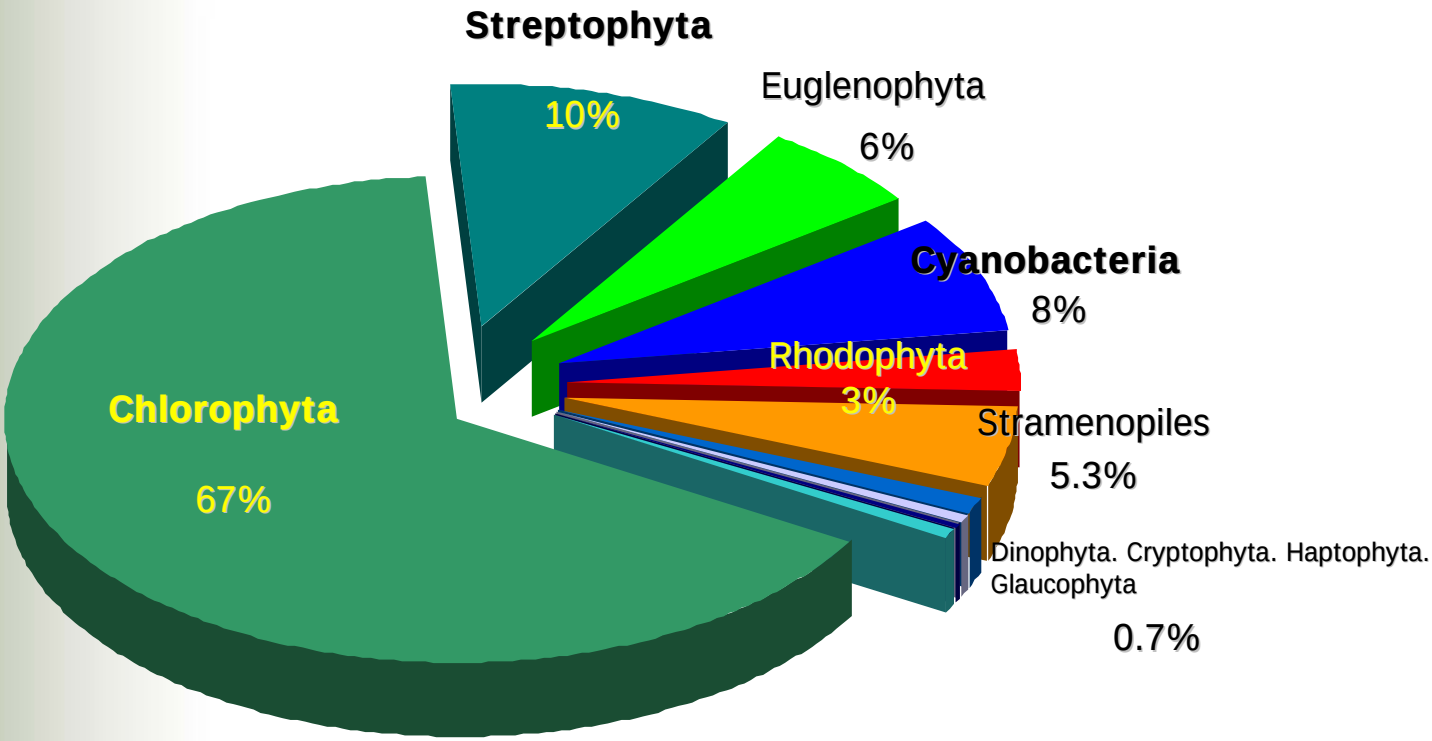
Enormous diversity of organization and life stages



SAG culture collection

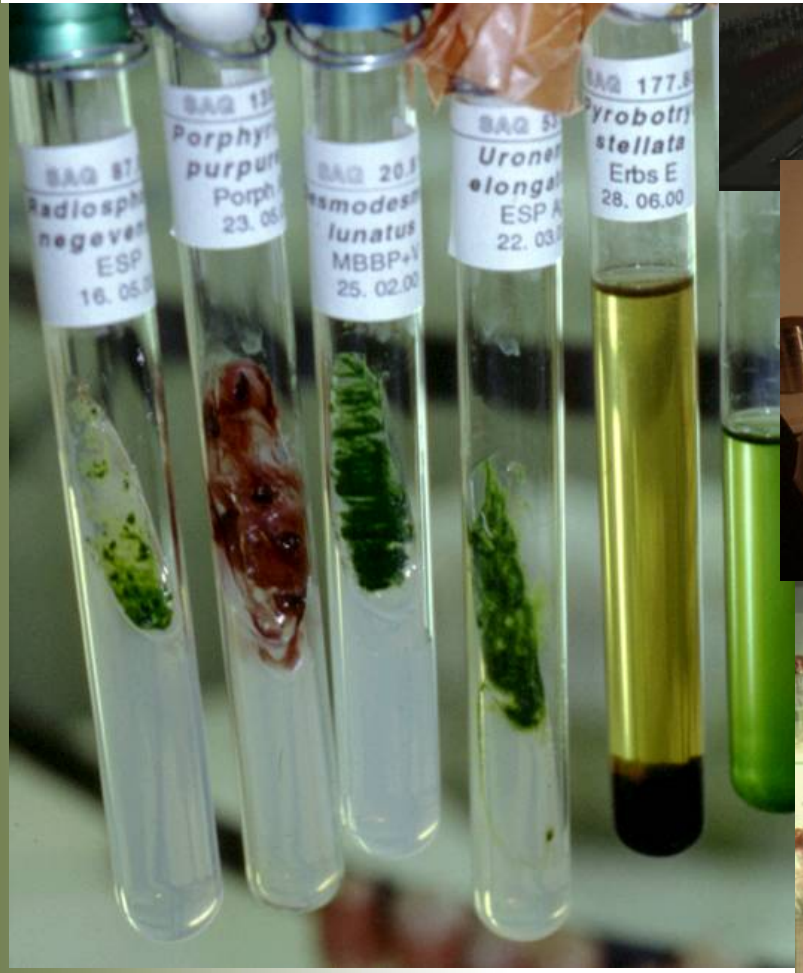
the challenge: phylogenetic diversity of microalgae:

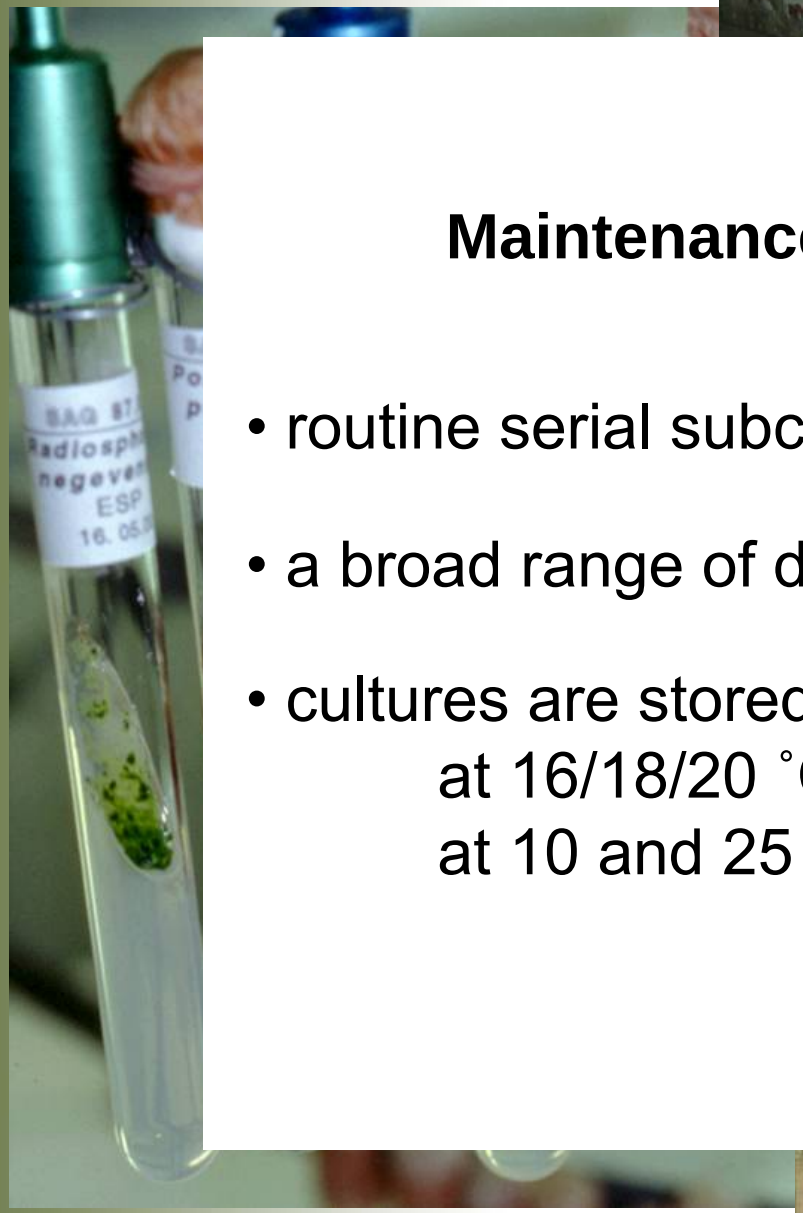
about 1,500 species (530 genera) with 2,400 strains



biological diversity

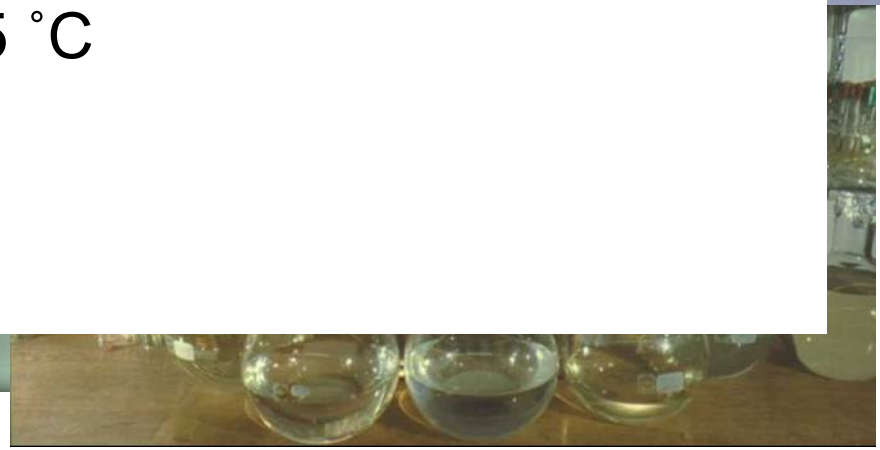
> diversity of culture maintenance





Maintenance of culture strains

- routine serial subculture of ~2400 strains
- a broad range of different media is applied
- cultures are stored in three culture rooms
  at 16/18/20 ˚C and in culture chambers
  at 10 and 25 ˚C



Cryopreservation of Microalgae at SAG

to prevent
- genotypic and phenotypic changes
- the risk of contaminations
- loss of important attributes
- loss of strain

to reduce costs of maintenance

to increase capacities of collection's holdings

at present: about 600 strains cryopreserved

SAG: a non-commercial institution

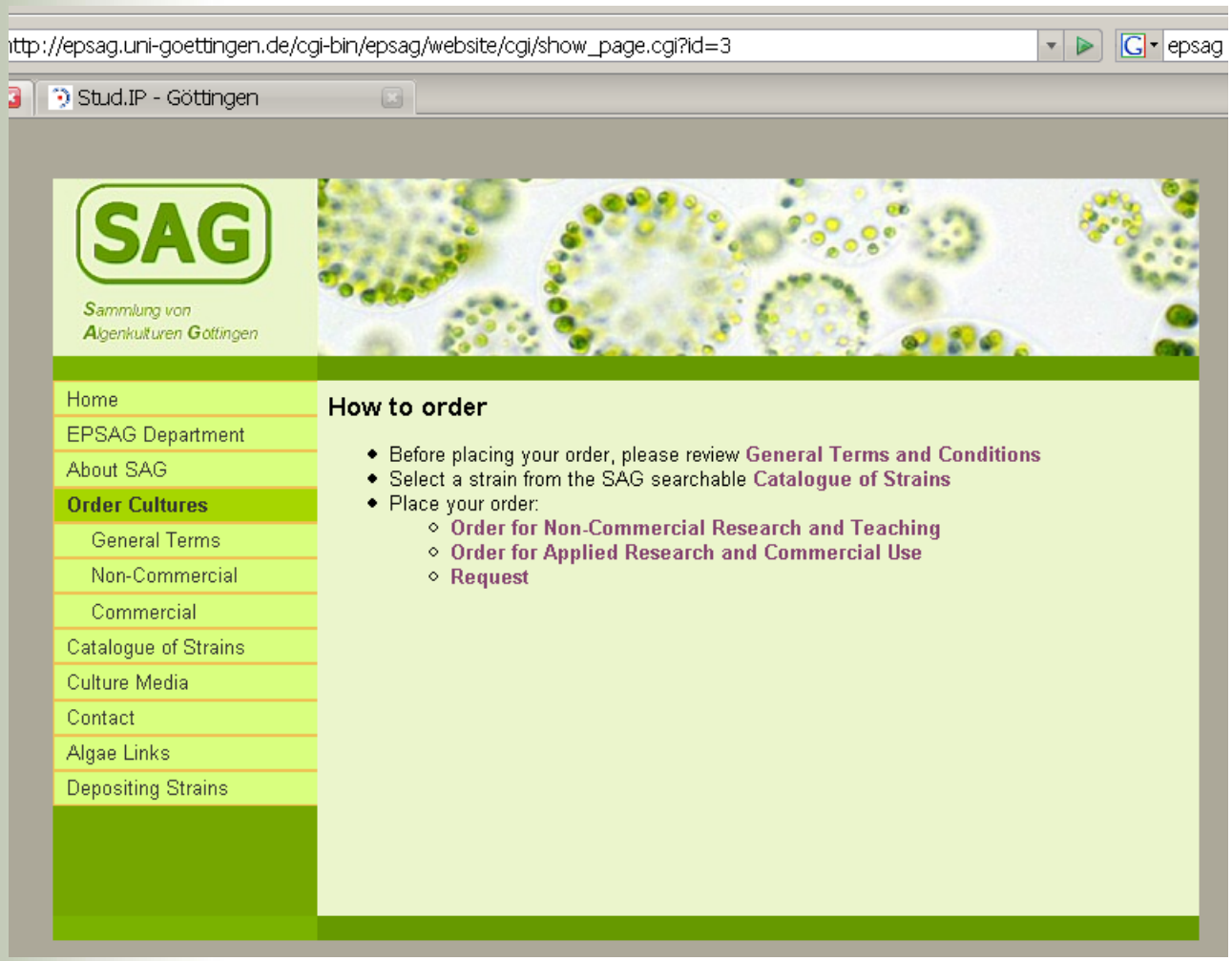
University of Göttingen covers staff costs and

provides culture facilities and laboratories

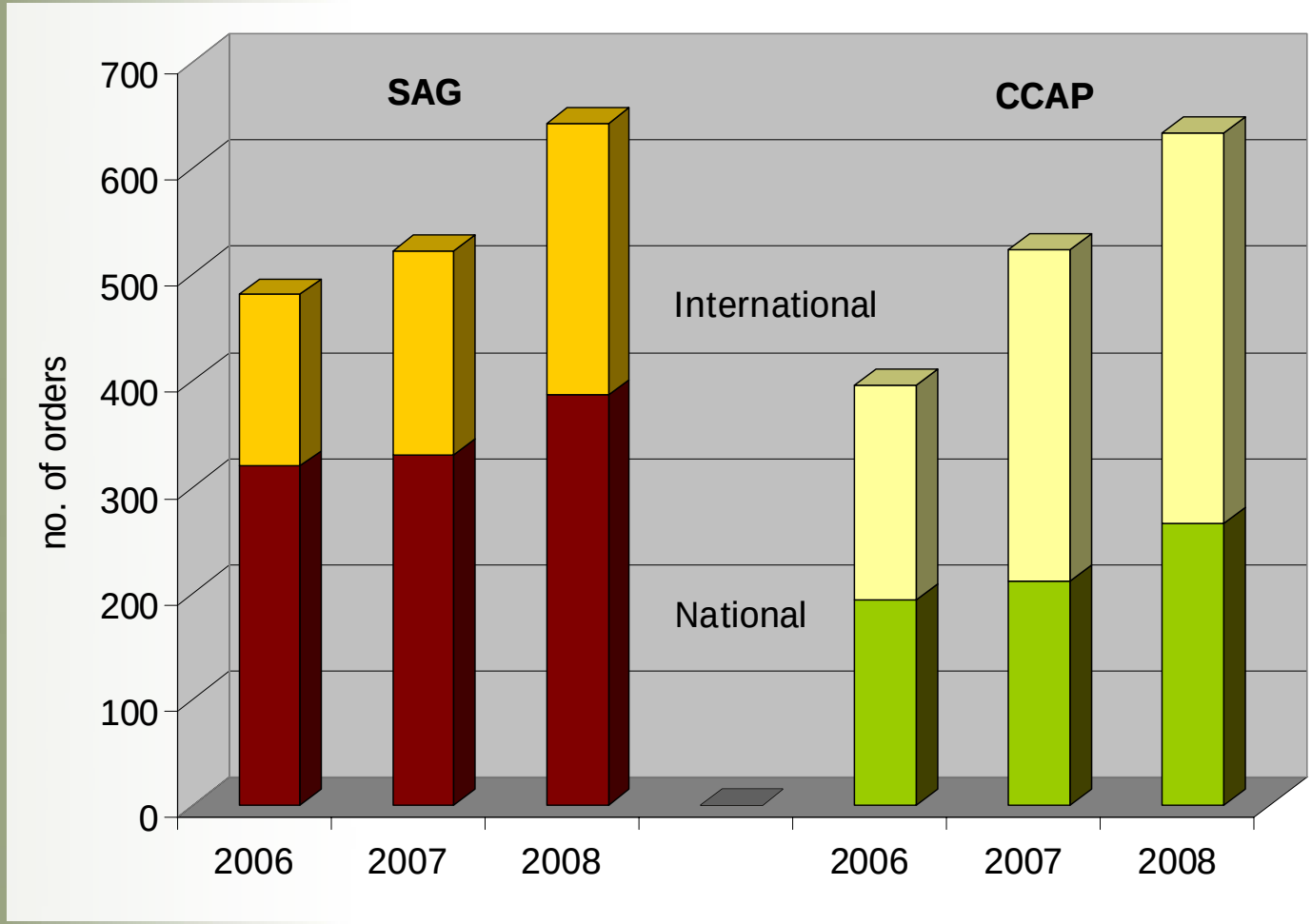
running costs are exclusively financed by

distribution of culture strains

Strain distribution: SAG online



Dispatch of algal cultures
(~ 600 orders for 2000 cultures per year)



Culture distribution: non-commercial orders

> highly subsidized rate

Academia, government and other non-profit making institutions/ individuals :

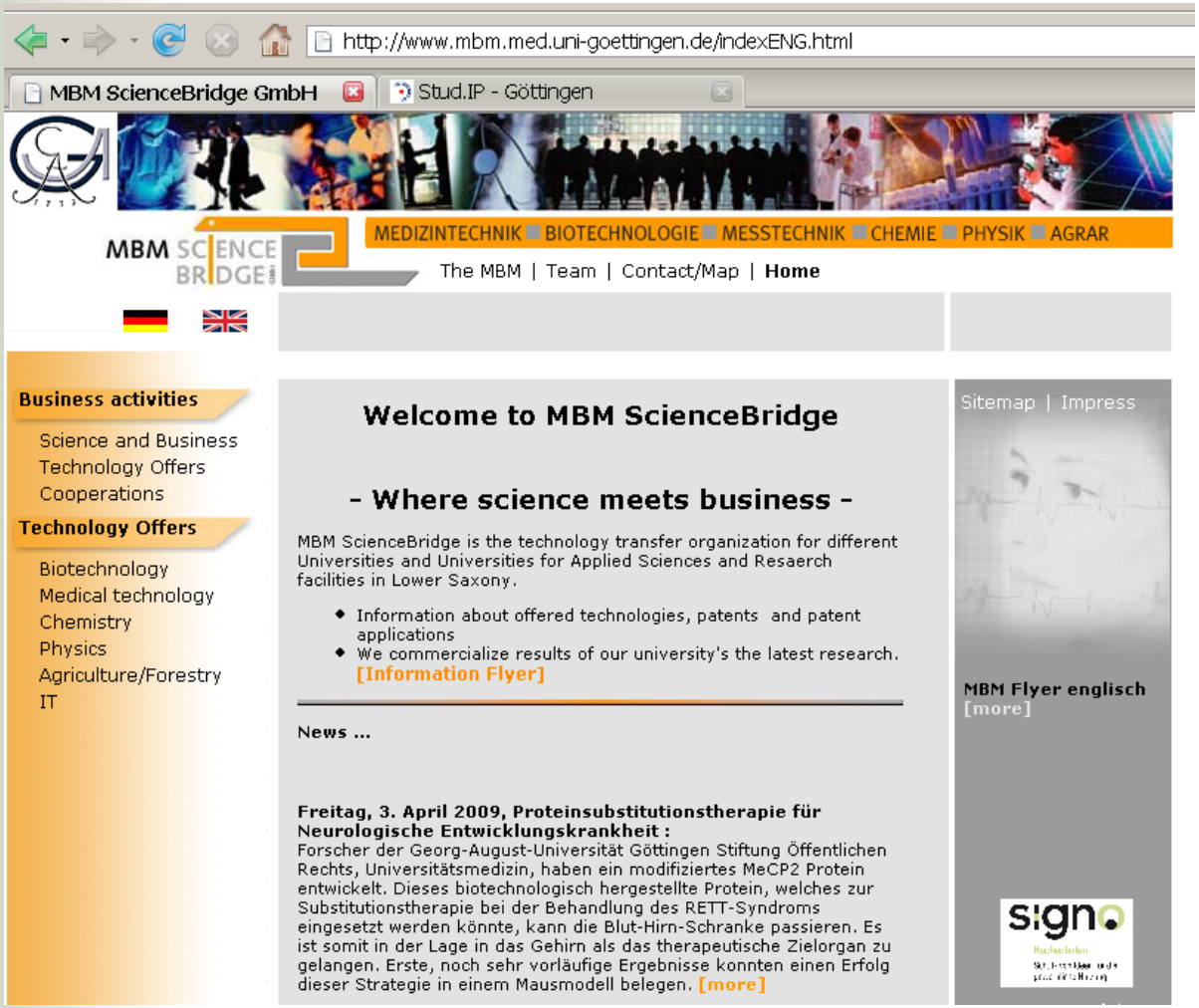
- teaching
- basic & non-commercial research

Strain distribution: commercial users

Specific material transfer agreement (MTA)

with advanced prices

Strain distribution: commercial users



Research at SAG:

Exploring Biodiversity

and Phylogeny

Research at SAG:

Exploring Biodiversity

and Phylogeny

using

different morphological

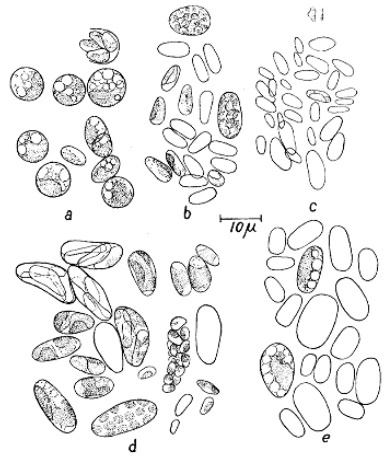
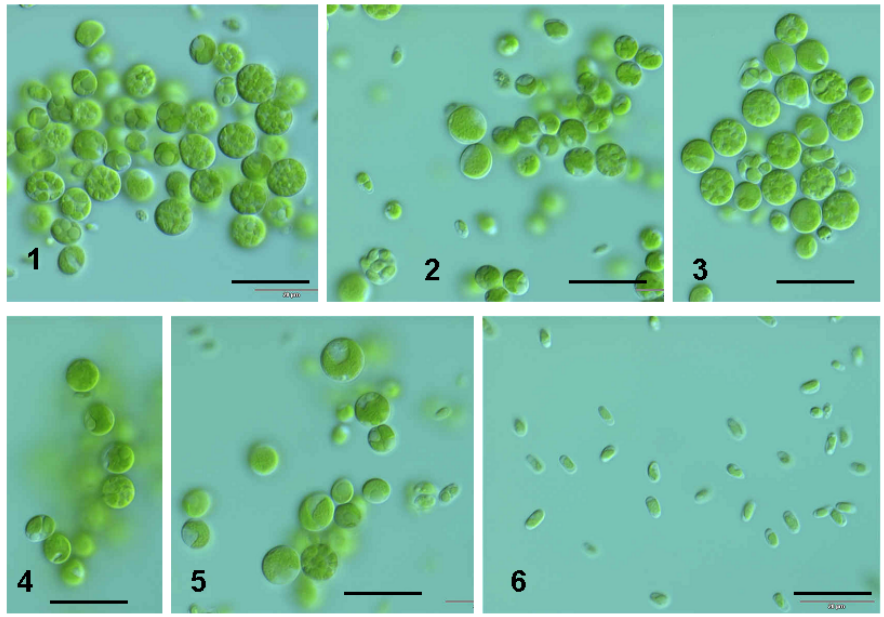


Abbildung 8. *Chlorocloster engadinensis* spec. nov., No. 252, auf Knop-Agar. *a* alte Kultur, mit Reservestoffen, rundlich. *b* junge Kultur. *c* drei Wochen alte Kultur mit wenigen Zoosporen. *d* vier Wochen alte Kultur. *e* ältere Kultur.

(Vischer 1945) Chlorocloster_812-1_Abb8.JPG

Chlorocloster engadinensis SAG 812-1



Research at SAG:

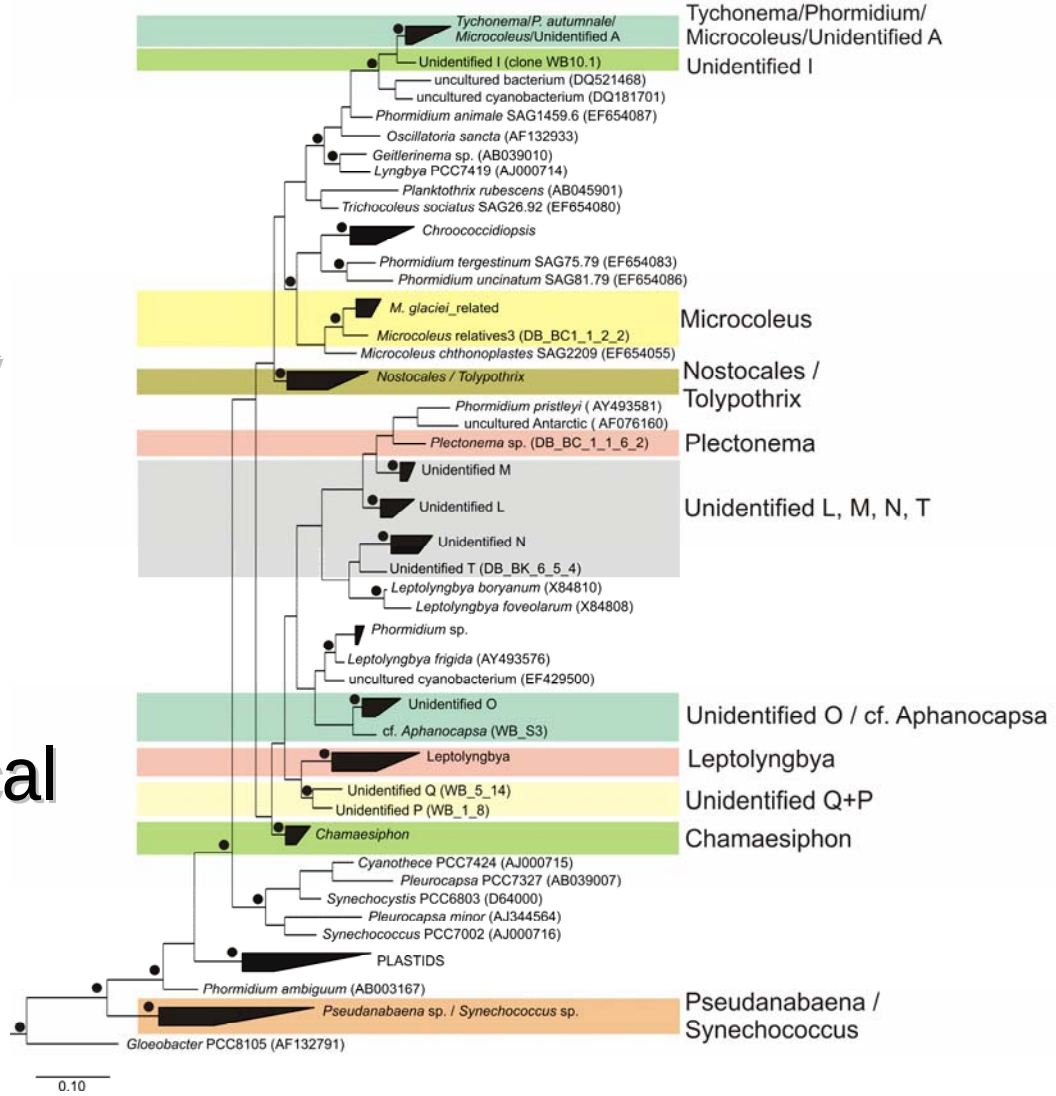
Exploring Biodiversity

and Phylogeny

using

different morphological

and molecular tools



Green biofilms on artificial hard substrates



extreme environment: strong fluctuations in humidity and light (UV-B, PAR)

- exploit new source of valuable compounds
- discover new green algal lineages
- treat biodeterioration in an evironmentally safe way



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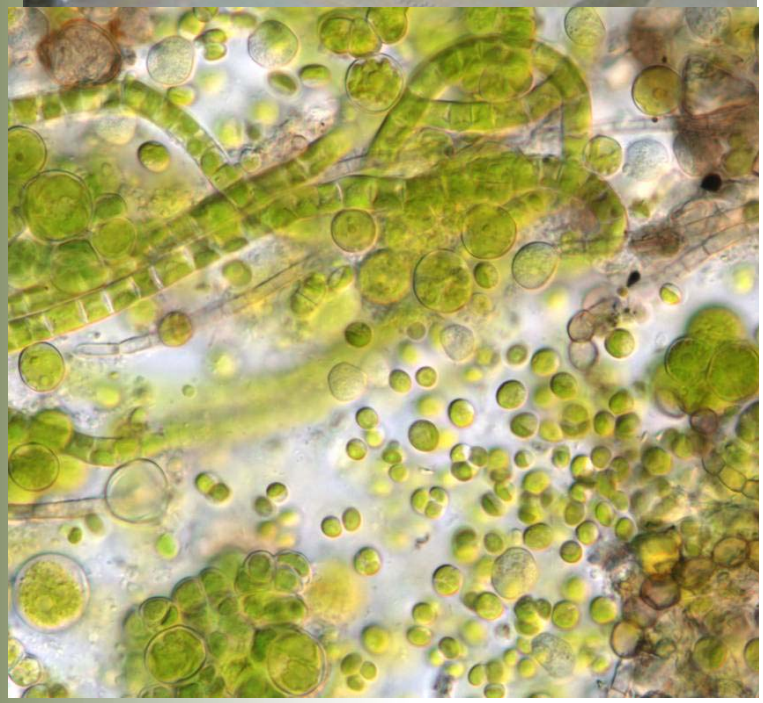
Results from a combined approach



5 rDNA clone libraries, **214 clones**:
(60% environmental samples,
40% from raw cultures)

23 phylotypes
17 green algae (15 Trebouxiophyceae,
2 Streptophyta)
6 Ascomycetes

New Species: *Chloroidium ellipsoideum*

adhesive properties: "glue"

Diversity of cyanobacteria and eukaryotic algae in biofilms on tufa stromatolites of hard water creeks

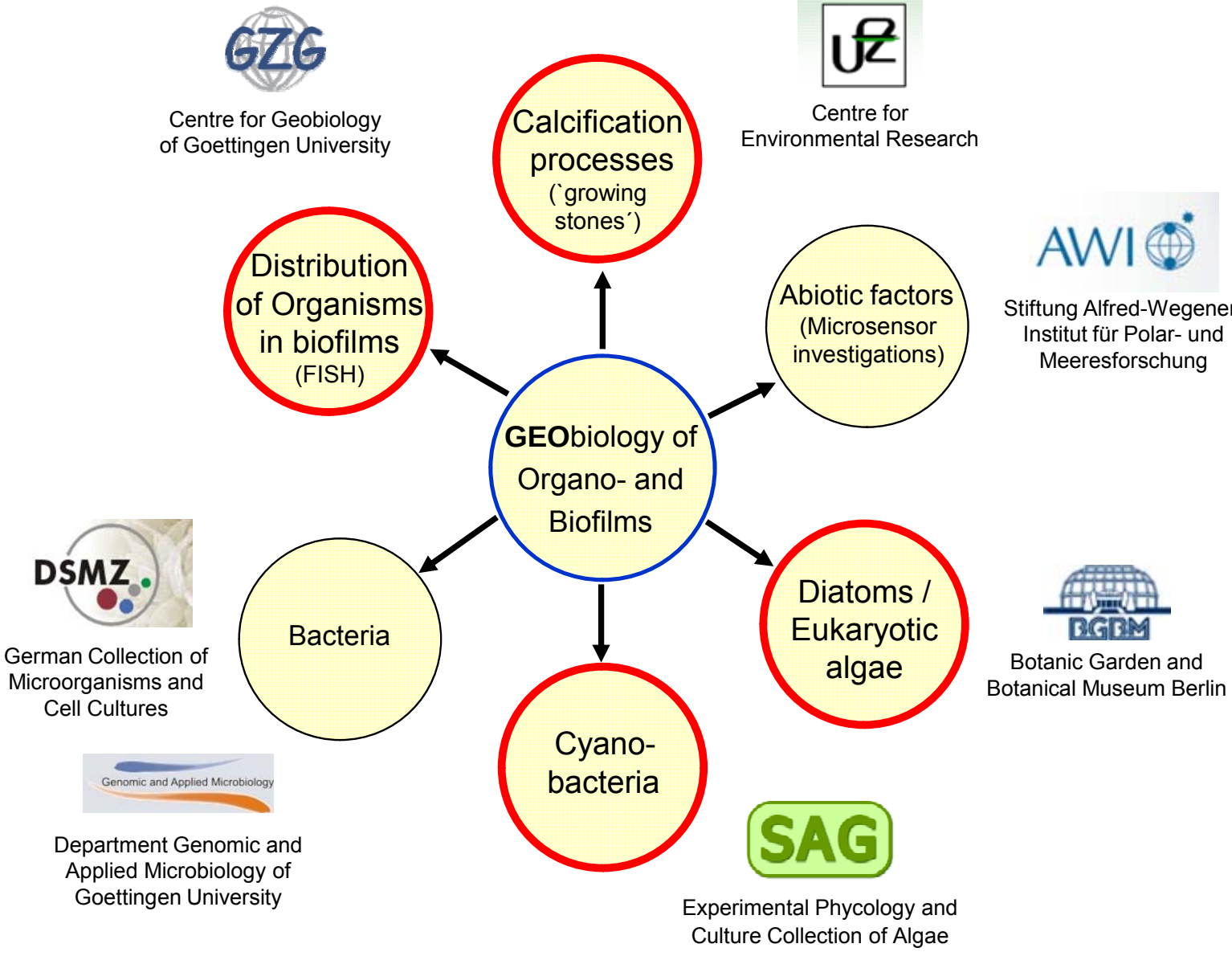
Nicole Brinkmann, Kathrin I. Mohr, Ladislav Hodač, Regine Jahn, Thomas Friedl

Georg-August-Universität Göttingen

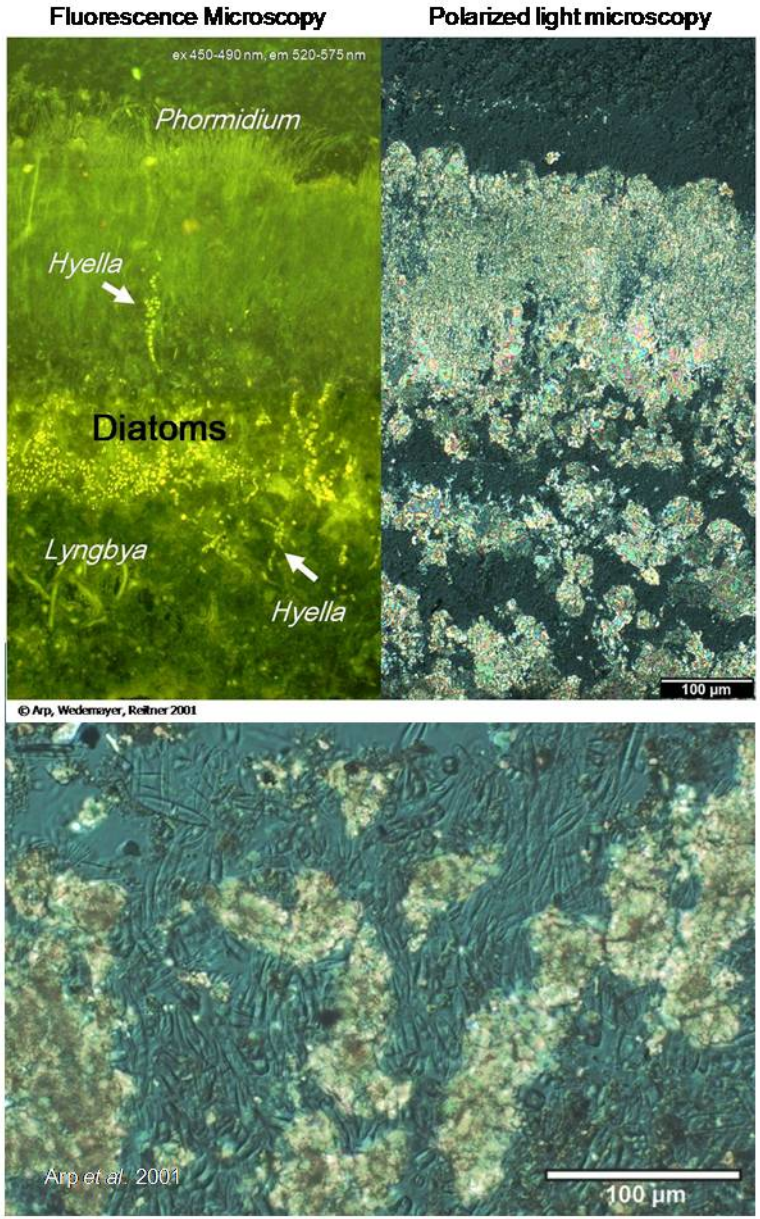
Forschergruppe Geobiologie

SAG

Geobiology of Organo- and Biofilms
For 571

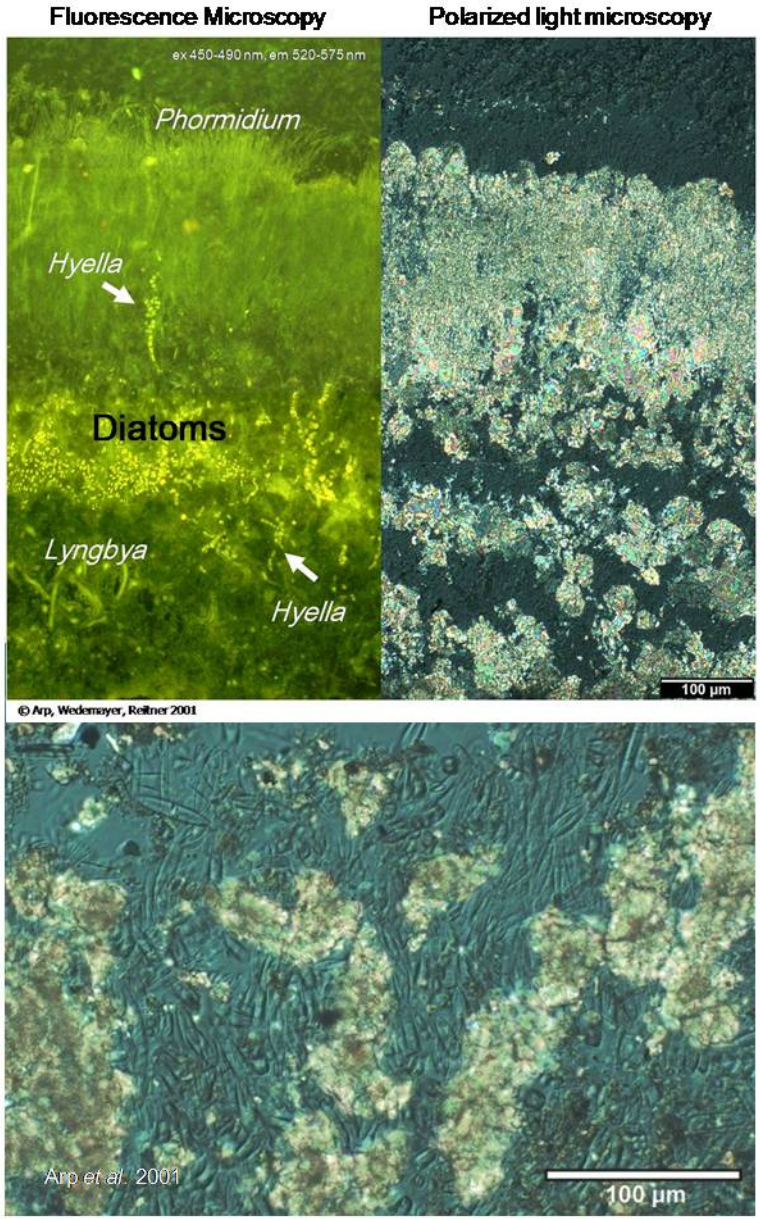


INTRODUCTION



- Stratified biofilms with different morpho-types of cyanobacteria and diatoms
- $CaCO_3$ precipitation at cyanobacterial filaments
- No $CaCO_3$ precipitation at diatom cells

dominance of cyanobacteria and diatoms



other

SAG Research Projects on Microalgae from Biofilms

- Soil Algae and Algae from Bark along gradients of land use intensities (DFG Biodiversity Exploratories)
- Green Algae dominating Biological Soil Crusts in Southern Africa Deserts
- Algae from Biofilms under extended periods of darkness
- Soil Algae from Polar Regions

new strains with new properties

Algae from Bark at Hainich Exploratory

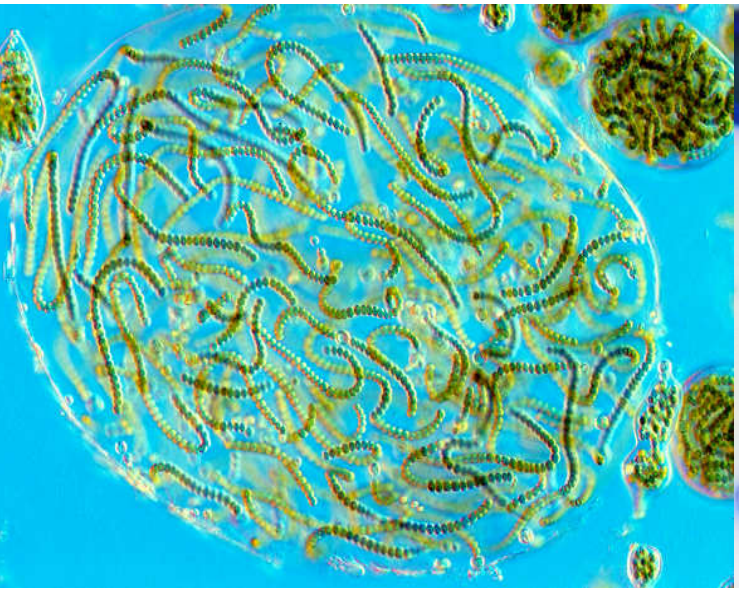
Assessing algal biodiversity in biofilm habitats

challenges for systematists:

- algal diversity still poorly represented

  in culture collections and sequence data bases
- taxonomic problems: more detailed studies based on

  reference and authentic strains needed
- revisit morphology **!**



Thank you !

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