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This issue inaugurates Cyanonews, intended to help connect the widely separated workers studying cyanobacteria. As a newsletter, Cyanonews may provide cyanobacteriologists with a forum for rapid, informal communication, unavailable through journals.

This first issue is many months later than I would have wished (My apologies if some request on the Billboard is no longer timely or some piece of news no longer news). In self defense I should institute a deadline for contributions, Nov. 1, 1985 for the next issue. Please send news, requests, publications, etc. by this date to the address below. If you are not in the directory, please also include your address, telephone, and brief description of research interests. Send (by Nov. 1) to:

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It’s still not clear to me how frequently the newsletter should be published and what features you’d like to see. A streamlined version might contain little more than publications and announcements of pertinent meetings. A more expansive version might include abstracts of work prior to publication, accounts of meetings, etc. Suggestions?

Several people have asked that meetings be announced soon enough in advance that they have a chance to go. I probably hear about no more meetings than you do, so please, if you know of a meeting that would be of interest to the body of cyanobacteriologists, send in the news.


For most meetings, however, there is no way of learning what went on except by contact with a participant. There are several interesting meetings this summer, for example, the 6th International Symposium on Nitrogen Fixation (Aug 4-10, Corvallis, Ore., USA), Workshop on Bioenergetics of Blue-Green Algae (Sep 16-21, Chios Island, Greece), and the 5th International Symposium on Photosynthetic Prokaryotes (Sep 22-28, Grunaueland, Switzerland). If you are attending a meeting of interest to the cyanobacterial world, please feel free to send in your comments for the newsletter. I will combine reports if we are so fortunate to have more than one contributor.

Several people suggested a subscription fee to defray mailing and printing costs. I can tell you that this issue has cost about $0.75 per North American participant and $1.50 for each participant outside. A cost per year depends on the size and frequency of future issues, which in turn depends on you. In any event, contributions will be cheerfully accepted, checks made payable to CYANONEWS - MSU.
Y.J. Avissar wants to know what is the best way to obtain in vitro nitrate reductase activity from filamentous cyanobacteria (preferably *Anabaena*).

S. Douglas would like to hear any news of recent isolations of small (<2 um) marine unicellular cyanobacteria.

J. Thomas proposes that there be an exchange (on request) amongst Newsletter contributors preprints of papers accepted for publication. [That leaves the problem of how potential requesters hear about the existence of preprints. In answer...] P. Boger suggests that abstracts of papers should be published in the newsletter prior to publication, immediately after submission.

M. Potts would like some antibody to glutamine synthetase (from *Nostoc* preferably or any *Anabaena*). Anyone have one?

R. Simon is writing a review on cyanobacterial inclusion bodies -- cyanophycin, polyphosphate, and carboxysomes. He would appreciate any reprints of recently published papers and preprints of work in progress.

F.R. Tabita wonders if there could be compiled a list of strains and their properties in each laboratory. [This sounds as if it could turn into a multivolume work! Before asking people to send in lists, perhaps I should ask for some feedback: do you want such a compilation? Exhaustive? Only selected (i.e. interesting) strains?]

N. Tandeau de Marsac would appreciate any information about new cloning vectors (availability, maps, etc.) and about plasmids or restriction endonucleases in strains newly checked. She also notes that the establishment of a general nomenclature for plasmids or cloning vectors would be of great help. [any suggestions?]

T. Thiel suggests that if you have a strain in search of a shuttle vector (for cloning), she would be more than happy to test in it the viability of her broad host-range plasmid, pRL153 (see NEWS, below).

R. Tuli points out that it's difficult to learn of negative results, for example, on topics such as protoplast formation, cell lysis, restriction digestion of DNA, and the cryptic nature of plasmids.

R. Tuli asks if anyone can supply an estimate on the contribution of cyanobacteria to global nitrogen fixation and to cultivated soil. R.T. also raises the point that an updated nomenclature and classification of cyanobacteria would be desirable, indicating variability in the occurrence of diazotrophy.

A. Vonshak is interested in obtaining *Spiculina* strains collected from nature.

Several people would like to learn about proven methods for long term storage and transportation of cyanobacteria.
K. Izui and H. Katsuki report that they have cloned the ppc gene (phosphoenolpyruvate carboxylase) from E. coli and A. nidulans and determined their nucleotide sequences. They are now attempting to return the A. nidulans gene by means of a shuttle vector that can replicate in both E. coli and A. nidulans. They are also interested in the preparation of cDNA clones of the ppc genes from eucaryotic organisms.

T. Thiel has found conditions under which glutamine satisfies the nitrogen requirement of Anabaena variabilis Nif12 but has no effect on heterocyst formation, that is, glutamine gets into the cell but does not repress heterocyst formation. She has performed experiments to exclude the possibility that ammonia produced from the spontaneous breakdown of glutamine is responsible for the effect.

Field experiments performed by J. Thomas and Tonina Fernandes using radioactive dinitrogen indicate that in a low nitrogen (0.07% N) soil, Nostoc-4 inoculation promotes nitrogen fixation amounting to 39 kg N/ha during a rice cropping season (120 days), whereas in a high nitrogen soil (0.22% N), the quantity is only about 7 kg N/ha.

P. Wolk, J. Elhai, T. Thiel, and Nancy Cross report that pRL153, based on the broad host-range vector RSF1010 is able to maintain itself at least in Anabaena M-131, Anabaena PCC7118, and Anacystis nidulans R2. pRL153 carries kanamycin/neomycin resistance and has 2 AvaI and 1 AvaII sites.

Sodium requirement and metabolism in nitrogen-fixing cyanobacteria
Joseph Thomas and Shree Kumar Apte
(Accepted by J. Biosci.)

Sodium affects the metabolism of eukaryotes and prokaryotes in several ways. This review collates information on the effects of Na⁺ on the metabolism of cyanobacteria with emphasis on the N₂-fixing filamentous species. Na⁺ is required for nitrogenase activity in Anabaena torulosa, Anabaena L-31, and Elecctonema boryanum. The features of this requirement have been mainly studied in Anabaena torulosa. The need for Na⁺ is specific and cannot be replaced by K⁺, Li⁺, Ca⁺², or Mg⁺². Processes crucial for expression nitrogenase such as molybdenum uptake, protection of the enzyme from oxygen inactivation and conformational activation of the enzyme are not affected by Na⁺. Mo-Fe protein and Fe protein, the two components of nitrogenase are synthesized in the absence of Na⁺ but the enzyme complex is catalytically inactive. Photoevolution of O₂ and CO₂ fixation, which are severely inhibited in the absence of Na⁺, are quickly restored by NH₄⁺, glutamine, or glutamate, indicating that Na⁺ deprivation affects photosynthesis indirectly due to deficiency in the products of N₂ fixation. Na⁺ deprivation decreases phosphate uptake, nucleoside phosphate pool, and nitrogenase activity. These effects are reversed by the addition of Na⁺.
suggesting that a limitation of available ATP caused by reduced phosphate uptake results in loss of nitrogenase activity during Na⁺ starvation.

Na⁺ influx in *Anabaena
torulosa* and *Anabaena L-31* is unaffected by low K⁺ concentration, is carrier mediated, follows Michaelis-Menten kinetics, and is modulated mainly by membrane potential. Treatments that cause membrane depolarization and hyperpolarization inhibit and enhance Na⁺ influx respectively. These cyanobacteria exhibit rapid active efflux of Na⁺, in a manner different from the Na⁺/H⁺ antiporter mechanism found in *Aphanizomenon nidulans.*

Na⁺ requirement in nitrogen metabolism including nitrate assimilation, synthesis of amino acids and proteins, in respiration and oxidative phosphorylation, in transport of sugars and amino acids, cellular distribution of absorbed sodium, physiological basis of salt tolerance and prospects of reclamation of saline soils by cyanobacteria are the other aspects discussed in this review.

=====================================================================

*PUBLICATIONS*


- Malcolm Potts (1984)

- Malcolm Potts, Mark A. Bowman and Nancy S. Morrison (1984)

- Malcolm Potts (1984)
  Isolation of plasmids from cyanobacteria. Focus 6(2):4-6.

- David W. Johnson and Malcolm Potts (1985)

- N.V. Nesterova, T.S. Sagun and S.E. Butenkod (1981)

- S.H. Li (1978)

  The nitrogenase activity and certain properties in several N2-fixing blue-green algae (Chinese; English abstract). Acta Hydrobiol. Sinica 7:57-60.


The autotrophic growth of *Spiculina platensis* in mass culture.
*Animal Waste Treatment and Utilization* (Chung Po, ed.), Council for

Huey-Ing Liu¹ (1984)
Studies on the effects of temperature and light intensity upon
growth rate, physiological and biochemical characteristics of
*Spiculina platensis* (Chinese; English summary)

¹Reprints available from: Huey-Ing Liu
Taiwan Agricultural Research
Institute, 189 Chung-Cheng Road
Wan-Feng, Wu-Feng
Taichung, Taiwan, Republic of China
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<td>Gene-transfer into and out of cyanobacteria</td>
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</tbody>
</table>

**Research Interests**

- **Castenholz, Richard**
  - Ecology/physiology
  - Ecology of hot springs
  - Sulfide effect on cyanobacteria

- **Chaplin, Alan E.**
  - Nitrogen Fixation

- **Ciferri, Orio**
  - Biochemistry and molecular biology of Spirulina

- **Conley, Pamela B.**
  - Phycobilisome polypeptide genes from chromatically-adapting cyanobacteria

- **Curtis, Stephanie**
  - Photosynthesis genes
  - Heterocyst differentiation

- **Douglas, Susan**
  - Molecular evolution
  - Marine Cyanobacteria

- **Dzelzkalns, Valdis**
  - Regulation of gene expression

- **Elhai, Jeff**
  - Genetics of heterocyst differentiation

- **Ernst, Anneliese**
  - Nitrogenase, hydrogenase
  - Photosynthesis, biosolar energy conversion
  - Storage compounds
  - Trace elements

- **Fogg, G.E.**
  - Planktonic cyanobacteria

- **Gallon, John**
  - Nitrogen fixation
  - Non-heterocystous cyanobacteria
<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
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<td>Ultrastructure Biology of cyanobacteria and cyanophages</td>
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<td>Grossman, Arthur</td>
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<td>Phycobilisome biosynthesis Regulation of phycobilisome genes Adaptation of cyanobacteria to stress</td>
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<td>Hostos, Eugenio de</td>
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<td>Adaptation to sulfur starvation in blue-greens and Chlamydomonas</td>
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<td>Enhancement of photosynthetic CO2 fixation Phosphoenolpyruvate carboxylase</td>
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Plasmid replication and function  
Photosynthesis  
Nitrogen fixation  
Genetics

Nitrogen fixation

Nitrogen fixation

Autotrophy  
Catalysis by RBCase/oxygenase  
Transformation

Expression of photosynthesis genes in A. nidulans and Chlamydomonas

Nitrogen fixation -- physiology, molecular biology  
Heterocyst development  
Bioenergetics  
Photosynthesis  
Membrane organization  
Genetics of unicellular cyanobacteria

Gene expression in cyanobacteria undergoing water stress and dessication

Photosynthesis/respiration  
Oxidative phosphorylation  
Cytochrome oxidase  
NAD(P)H-dehydrogenase  
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Transformation
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Nitrogen metabolism
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Structure and expression of rRNA, tRNA and ribosomal protein genes

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Regulation of genes of photosystem II in vegetative cells and heterocysts of Anabaena

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Site-directed alteration of polypeptides

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Carbon dioxide fixation

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Anabaena/Azolla
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Peroxide removal

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Heavy metal accumulation
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Transformation and transduction
Proteolysis
Amino acid utilization
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