

UNIVERSIDAD AUTÓNOMA DE BARCELONA

FACULTAD DE CIENCIAS



DINÁMICA POBLACIONAL COMPARADA DE  
BACTERIAS FOTOSINTÉTICAS PLANCTÓNICAS

CARLES ABELLÀ

1980

## 6. BIBLIOGRAFÍA

- ABELLA, C., E. MONTESINOS & R. GUERRERO. 1980. Field Studies on the competition between purple and green sulfur bacteria for available light. *Developments in Hydrobiology*. Dr. Junk, La Haya (en prensa).
- ABELLA, C., E. MONTESINOS & R. GUERRERO. Dinàmica i estratificació de poblacions bacterianes fototòfiques en una cubeta meromíctica del llac de Banyoles. *Bull. Soc. Cat. Biol.* (en prensa).
- AIKING, H. & G. SOJKA. 1979. Response of Rhodopseudomonas capsulata to illumination and growth rate in a light-limited continuous culture. *J. Bacteriol.* 139:530-536.
- AMERICAN PUBLIC HEALTH ASSOCIATION. 1975. Standard methods for the examination of water and wastewater. APHA-AWWA-WPCF, Washington, 14a. ed.
- ANDERSON, G.C. 1958. Some limnological features of a shallow saline meromictic lake. *Limnol. Oceanogr.* 3:259-270.
- ARMITAGE, J.P., P. KEIGHLEY & M.C.W. EVANS. 1979. Chemotaxis in photosynthetic bacteria. *FEMS Microbiol. Letters* 6:99-102.
- BAAS-BECKING, L.G.M. 1925. Studies on the sulfur bacteria. *Ann. Bot. Soc. Lond.* 39:613-650.
- BAAS-BECKING, L.G.M., I.R. KAPLAN & D. MOORE. 1960. Limits of the natural environment in terms of pH and oxidation-reduction potentials. *J. Geol.* 68:243-283.
- BAVENDAMM, W. 1924. Die farblosen und roten Schwefelbakterien des Süss und Salzwassers. Gustav Fisher, Jena.
- BEEFTINK, H.H. & H. VAN GEMERDEN. 1979. Actual and potential rates of substrate oxidation and product formation in continuous cultures of Chromatium vinosum. *Arch. Microbiol.* 121 :161-167.
- BERGSTEIN, T., Y. HENIS & B.Z. CAVARI. 1979. Investigations on the photosynthetic sulfur bacterium Chlorobium phaeobacteroides causing seasonal blooms in lake Kinneret. *Can. J. Microbiol.* 25: 999-1007.
- BERTRU, G. 1978. Anaérobiose au niveau des sédiments et répartition des bactéries au sein de la colonne d'eau. *Int. Revue ges. Hydrobiol.* 63:205-212.

- BIELB, H. 1973. Die Verbreitung der Schwefelfreien Purpurbakterien im Plussee und anderen Seen Ostholsteins. Tesis doctoral, Universidad de Friburgo.
- BIELB, H. & G. DREWS. 1969. Das in-vivo-Spektrum als taxonomisches Merkmal bei Untersuchungen zur Verbreitung von Athiorhodaceae. Zbl. Bakt. Abt. II, 123:425-452.
- BIELB, H. & N. PFENNIG. 1978. Growth yields of green sulfur bacteria in mixed cultures with sulfur and sulfate reducing bacteria. Arch. Microbiol. 117:9-16.
- BIELB, H. & N. PFENNIG. 1979. Anaerobic CO<sub>2</sub> uptake by phototrophic bacteria. A review. Arch. Hydrobiol. Beih. Ergeb. Limnol. 12:48-58.
- BLACKBURN, T.H., P. KLEIBER & T. FENCHEL. 1975. Photosynthetic sulfide oxidation in marine sediments. Oikos 26:103-108.
- BOUCHER, F., M. VAN DER REST & G. GINGRAS. 1977. Structure and function of carotenoids in the photoreaction center from Rhodospirillum rubrum. Biochim. Biophys. Acta 461:339-537.
- BREMMENG, G.S. 1974. Strandvatn, northern Norway, a lake with old sea water. Schweiz. Z. Hydrobiol. 36:351-356.
- BROCH-DUE, M. & J.G. ORMEROD. 1978. Isolation of a bchl c mutant from Chlorobium with bchl d by cultivation at low light intensity. FEMS Microbiol. Letters 3:305-308.
- BROCH-DUE, M., J.G. ORMEROD & B.S. FJERDINGEN. 1978. Effect of light intensity on vesicle formation in Chlorobium. Arch. Microbiol. 116:269-274.
- BROCK, T.D. 1979. Biology of microorganisms. Prentice-Hall, Englewood Cliffs, 3a. ed.
- BRUNSKILL, G.J. & S.D. LUDLAM. 1969. Fayetteville Green lake, New York. I. Physical and chemical limnology. Limnol. Oceanogr. 14:817-829.
- BUCHANAN, R.E. & N.E. GIBBONS (eds). 1974. Bergey's manual of determinative bacteriology. The Williams & Wilkins Co., Baltimore 8a. ed.
- CALDWELL, D.E. & J.M. TIEDJE. 1975a. A morphological study of anaerobic bacteria from the hypolimnia of two Michigan lakes. Can. J. Microbiol. 21:362-376.

- CALDWELL, D.E. & J.M. TIEDJE. 1975b. The structure of anaerobic bacterial communities in the hypolimnia of several Michigan lakes. *Can. J. Microbiol.* 21:377-385.
- CASAS, C. 1978. Estructura y significado ecológico de las poblaciones bacterianas heterotroficas de dos medios acuáticos con diferente nivel trófico. Tesis doctoral, Universidad Autónoma de Barcelona.
- CAVARI, B. 1976. ATP in lake Kinneret: Indicator of microbial biomass or phosphorous deficiency? *Limnol. Oceanogr.* 21: 231-236.
- CERRUTI, A. 1938. Le condizioni oceanografiche e biologiche del Mar Piccolo di Taranto durante l'agosto del 1938. *Piscic. Boll. Idrobiol.* 14:711-751.
- CHROST, R. & D. BRZESKA. 1978. Extracellular release of organic products and growth of bacteria in Anabaena cylindrica culture. *Acta Microbiol. Polon.* 27:287-295.
- CLAYTON, R.K. 1953. Studies on the phototaxis of Rhodospirillum rubrum. I. Action spectrum, growth in green light and WEBER law adherence. *Arch. Microbiol.* 19:107-117.
- CLAYTON, R.K. & W.R. SISTROM (eds.). 1978. The photosynthetic bacteria. Plenum Press, New York.
- COHEN, Y., W.E. KRUMBEIN, M. GOLDBERG & M. SHILO. 1977a. Solar lake (Sinai). 1. Physical and chemical limnology. *Limnol. Oceanogr.* 22:497-608.
- COHEN, Y., W.E. KRUMBEIN & M. SHILO. 1977b. Solar lake (Sinai). 2. Distribution of phososynthetic microorganisms and primary production. *Limnol. Oceanogr.* 609-620.
- COHEN, Y., W.E. KRUMBEIN & M° SHILO. 1977c. Solar lake (Sinai). 3. Bacterial distribution and production. *Limnol. Oceanogr.* 22:621-634.
- COHEN, Y., W.E. KRUMBEIN & M. SHILO. 1977d. Solar lake (Sinai). 4. Stromatolitic cyanobacterial mats. *Limnol. Oceanogr.* 22: 635-656.
- COLLINS, V. 1960. The distribution and ecology of gram-negative organisms other than Enterobacteriaceae in lakes. *J. Appl. Bact.* 23:510-514.

- COOPER, R.C. 1963. Photosynthetic bacteria in waste treatment.  
En Developments in industrial microbiology 4:95-103. Amer.  
Inst. Biol. Sci., Arlington.
- CULVER, D.A. & G.D. BRUNSKILL. 1969. Fayetteville Green lake.V.  
Studies of primary production and zooplankton in a meromictic  
marl lake. Limnol. Oceanogr. 14:862-873.
- CZECZUGA, B. 1968a. An attemp to determine the primary production  
of the green sulphur bacteria, Chlorobium limicola Nads,  
(Chlorobacteriaceae). Hydrobiologia 31:317-333.
- CZECZUGA, B. 1968b. Primary production of the purple sulfuric  
bacteria Thiopedia rosea Winogradsky (Thiorhodaceae). Photosyn-  
thetica 2:161-166.
- CZECZUGA, B. 1972. Determination of organic substances originating  
in photosynthetic activity of bacteria. Fortschr. Wasserchem.  
Grenzgeb. 14:61-65.
- CZECZUGA, B. & F. GRADZKI. 1973. Relationship between extracellular  
and cellular production in the sulfuric green bacterium  
Chlorobium limicola Nads.(Chlorobacteriaceae) as compared to  
primary production of phytoplankton. Hydrobiologia 42:85-95.
- DAVISON, W. 1980. Studies of chemical speciation in naturally  
anoxic basins, 48 Annual Report. Freshwater Biological Asso-  
ciation, Ambleside.
- DERENBACH, J.B., H. ASTHEIMER, H.P. HANSEN & H. LEACH. 1979.  
Vertical microscale distribution of phytoplankton in relation  
to the thermocline. Mar. Ecol. Prog. Ser. 1:187-193.
- DEVEZE, L. & Y. FAUVEL. 1966. Un phénomène bactérien d'eaux  
rouges dans l'étang d'Ingril (Hérault). Rev. Trav. Inst.  
Pêches Marit. 30:365-374.
- DIEHL, P. & H. HAARDT. 1980. Measurement of the spectral attenuation  
to support biological research in a "plankton tube" experiment.  
Oceanol. Acta 1:89-96.
- DIJKEMA, C., P.A.M. MICHELS & W.N. KONINGS. 1980. Light-induced  
spectral changes of carotenoids in chromatophores of Rhodopseu-  
domonas sphaeroides. Arch. Biochem. Biophys. 201:403-410.
- DOETSCH, R.N. & T.M. COOK. 1973. Introduction to bacteria and  
their ecobiology. Medical and Technical Pub. Co., Lancaster  
(University Park Press, Baltimore).

- DUBININA, G.A. & S.I. KUZNETSOV. 1976. The ecological and morphological characteristics of microorganisms in Lesnaya Lamba (Karelia). *Int. Revue ges. Hydrobiol.* 61:1-19.
- DUBINSKY, Z. & T. BERMAN. 1979. Seasonal changes in the spectral composition of downwelling irradiance in lake Kinneret (Israel). *Limnol. Oceanogr.* 24:652-663.
- DUCKSTEIN, L., J. CASTI & J. KEMPF. 1979. Modeling phytoplankton dynamics using catastrophe theory. *Water Resources Res.* 15: 1189-1194.
- DÜGGELI, M. 1924. Hydrologische Untersuchungen im Pioragebiet. Bakteriologische Untersuchungen am Ritomsee. Schweiz. Z. Hydrobiol. 2:65-205.
- EMERSON, R. & C.M. LEWIS 1942. The photosynthetic efficiency of phycocyanin in Chroococcus, and the problem of carotenoid participation in photosynthesis. *J. Gen. Physiol.* 25:579-595.
- EMILIANI, F. 1973. Algunos aspectos bacteriológicos del lago Vilà (Gerona, España). *P. Inst. Biol. Apl.* 54:39-51.
- ESTEVE, I., C. ABELLÀ & R. GUERRERO. Identificació i estudi poblacional de bacteris fototòfics a l'estanyol de Sisó (Banyoles). Aplicació de tècniques de microscòpia electrònica. (en prensa).
- EVANS, M.C.W., B.B. BUCHANAN & D.I. ARNON. 1966. A new ferrodoxin-dependent carbon reduction cycle in a photosynthetic bacterium. *Proc. Natl. Acad. Sci. USA.* 55:928-935.
- FAAFENG, B. 1976. Photosynthetic bacteria. Their distribution and function in nature. *Blyttia* 34:53-65.
- FANICA-GAIGNIER, M., J. CLEMENT-METRAL & M.D. KAMEN. 1971. Adenine nucleotide levels and photopigment synthesis in a growing photosynthetic bacterium. *Biochim. Biophys. Acta* 226: 135-143.
- FENCHEL, T. & B.J. STRAARUP. 1971. Vertical distribution of photosynthetic pigments and the penetration of light in marine sediments. *Oikos* 22:172-182.
- FOGG, G.E. & W.D. WATT. 1965. The kinetics of release of extracellular products of photosynthesis by phytoplankton. In C.R. Goldman (ed.), Primary productivity in aquatic environments. Mem. Ist. Ital. Idrobiol. Suppl. 18:165-174.

- FORTI, A. 1932. Il "lago di sangue" a Pergusa in Sicilia e la prima piagia d'Egitto. *Nat. Sicil.*, N.S. 8:63.
- FREVERT, T. 1979. The pe redox concept in natural sediment water systems; its role in controlling phosphorous release from lake sediments. *Arch. Hydrobiol. Suppl.* 55:278-297.
- FRITZ, J.S. & M.Q. FREELAND. 1955. Direct titrimetric determination of sulfate: macrotitration. *Anal. Chem.* 26:1593-1595.
- FRITZ, J.S. & S.S. YAMAMURA. 1955. Rapid microtitration of the sulfates. *Anal. Chem.* 26:1461-1464.
- GENOVESE, S. 1963. The distribution of the H<sub>2</sub>S in the lake Faro (Mesina) with particular regard to the presence of "red water". In C.H. Oppenheimer (ed), *Marine Microbiology*. Thomas, Springfield.
- GENOVESE, S., C. RIGANO & C. MACRI. 1963. Ciclo annuale di osservazioni microbiologiche nel lago di Faro. *Atti. Soc. Peloritana Sci. Fis. Mat. Nat.* 9:293-329.
- GIBSON, J., E. STACKE BRANDT, L.B. ZABLEN, R. GUPTA & C.R. WOESE. 1979. A phylogenetic analysis of the purple photosynthetic bacteria. *Current Microbiology*. 3:59-68.
- GLOE, A., N. PFENNIG, H. BROCKMANN & W. TROWITZSCH. 1975. A new bacteriochlorophyll from brown-colored Chlorobiaceae. *Arch. Microbiol.* 102:103-109.
- GÖBEL, F. 1978. Direct measurements of pure absorbance spectra of living phototrophic microorganisms. *Biochim. Biophys. Acta* 538:593-602.
- GOEDHEER, J.C. 1959. Energy transfer between carotenoids and bacteriochlorophyll in chromatophores of purple bacteria. *Biochim. Biophys. Acta* 35:1-8.
- GOEHLE, K.H. & J.F. STORR. 1978. Biological layering resulting from extreme meromictic stability, Devil's Hole, Abaco Island Bahamas. *Verh. Internat. Verein. Limnol.* 20:550-555.
- GOLTERMAN, H.L., R.S. CLYMO & M.A.M. OHNSTAD (eds). 1978. Methods for physical and chemical analysis of fresh waters. Blackwell, Oxford, 2a. ed.

- GORLENKO, V.M. 1977. Die phototrophen Bakterien in den Stratifizierten Seen und ihre Ökologie. En I. Daubner (ed). II Internationales Hydromikrobiologisches Symposium VEDA, Praga.
- GORLENKO, V.M., E.N. CHEBOTAREV & V.I. KACHALKIN 1973. Microbiological processes of oxidation of hydrogen sulfide in the Repnoe lake (Slavjansk lakes). *Microbiology* 42:723-728.
- GORLENKO, V.M., E.N. CHEBOTAREV & V.I. KACHALKIN. 1974a. Microbial oxidation of hydrogen sulfide in lake Veisovo (Slavyansk lakes). *Microbiology* 43:450-453.
- GORLENKO, V.M., E.N. CHEBOTAREV & V.I. KACHALKIN. 1974b. Participation of microorganisms in the circulation of sulfur in Pomyaretskoe lake. *Microbiology* 43:772-776.
- GORLENKO, V.M. & S.I. KUZNETSOV. 1972. Über die photosynthesierenden Bakterien des Kononjer-Sees. *Arch. Hydrobiol.* 70:1-13.
- GORLENKO, V.M. & G.V. LEVEBA. 1971. Vertical distribution of photosynthetic bacteria in the Kononier lake in the Mari, USSR. *Microbiology* 40:651-652.
- GORLENKO, V.M., M.B. VAINSTEIN & V.I. KACHALKIN. 1978. Microbiological characteristics of lake Mogilnoye. *Arch. Hydrobiol.* 81:475-492.
- GUERRERO, R. & C. ABELLÀ. 1978. Dinámica espaciotemporal de las poblaciones bacterianas fotosintéticas en una laguna anaerobia de aguas sulfurosas. *Oecol. Aquatica* 3:193-205.
- GUERRERO, R., C. ABELLÀ & M.R. MIRACLE. 1978. Spatial and temporal distribution of bacteria in a meromictic karstic lake basin: relationships with physicochemical parameters and zooplankton. *Verh. Internat. Verein. Limnol.* 20:2264-2271.
- GUERRERO, R., E. MONTESINOS, I. ESTEVE & C. ABELLÀ. 1980. Physiological adaptation and growth of purple and green sulfur bacteria in a meromictic as compared to a holomictic lake. Developments in Hydrobiology. Dr. Junk, La Haya (en prensa)
- GUERRERO, R., F. RODA, C. ABELLÀ & F. TORRELLA. 1975. Optimal growth temperatures and media parameters of bacterial communities from lakes of different trophic states. *Verh. Internat. Verein. Limnol.* 19:2620-2626.

- HAMMER, U.T., R.C. HAYNES, J.R. LAWRENCE & M.C. SWIFT. 1978. Meromixis in Waldsea lake, Saskatchewan. Verh. Internat. Verein. Limnol. 20:192-200.
- HARTREE, E.F. 1972. Determination of protein: a modification of the Lowry method that gives a linear photometric response. Anal. Biochem. 48:422-427.
- HAYDEN, J.F. 1972. A limnological investigation of a meromictic lake (Medicine lake, South Dakota) with special emphasis on pelagic primary production. Master's Thesis, Universidad de South Dakota.
- HAYNES, R.C. & U.T. HAMMER. 1978. The saline lakes of Saskatchewan. IV. Primary production by phytoplankton in selected saline ecosystems. Int. Rev. ges. Hydrobiol. 63:337-351.
- HEANEY, S.I. & J.F. TALLING. 1980. Ceratium hirundinella-Ecology of a complex mobile, and successful plant. 48 Annual Report. Freshwater Biology Association, Ambleside.
- HODSON, R.E., O.HOLM-HANSEN & F. AZAM. 1976. Improved methodology for ATP determination in marine environments. Mar. Biol. 34: 143-149.
- HOLM-HANSEN, O. 1969. Determination of microbial biomass in ocean profiles. Limnol. Oceanogr. 14:740-747.
- HOLT, S.C. & A.G. MARR. 1965. Effect of light intensity on the formation of intracytoplasmic membrane in Rhodospirillum rubrum. J. Bacteriol. 89:1421-1429.
- HUMPHREY, G.F. & M. WOOTTON. 1966. Comparison of the techniques used in the determination of phytoplankton pigments. Report SCOR-UNESCO, París.
- HUSSAINY, S.U. 1972. Bacterial and algal chlorophyll in two salt lakes in Victoria, Australia. Water Res. 6:1361-1365.
- HUTCHINSON, G.E. 1957. A treatise on limnology. I. Geography, physics and chemistry of lakes. J. Wiley & Sons, New York.
- HUTCHINSON, G.E. 1978. An introduction to population ecology. Yale University Press, New Haven.
- IMHOFF, J.F., H.G. SAHL, G.S.H. SOLIMAN & H.G. TRÜPER. 1979. The Wadi Natrum: chemical composition and microbial mass developments in alcaline brines of eutrophic desert lakes. Geomicrobiol. J. 1:219-233.

- INDREBØ, G., B. PENGURUD & I. DUNDAS. 1979a. Microbial activities in a permanently stratified estuary. I. Primary production and sulfate reduction. *Mar. Biol.* 51:295-304.
- INDREBØ, G., B. PENGURUD & I. DUNDAS. 1979b. Microbial activities in a permanently stratified estuary. II. Microbial activities at the oxic-anoxic interface. *Mar. Biol.* 51:305-309.
- JERLOV, N.G. 1968. Optical oceanography. Elsevier, Amsterdam.
- JEWSON, D.H. & J.A. TAYLOR . 1978. The influence of turbidity on net phytoplankton photosynthesis in some Irish lakes. *Freshwater Biology* 8:573-584.
- JONES, J.G. 1977a. Variation in bacterial populations in time and space. 45 Annual Report. Freshwater Biological Associations, Ambleside.
- JONES, J.G. 1977b. The study of aquatic microbial communities. En F.A. Skinner & J.M. Shewan (eds.), *Aquatic microbiology*. Academic Press, New York.
- JONES, R.I. 1978. Adaptations to fluctuating irradiance by natural phytoplankton communities. *Limnol. Oceanogr.* 23:920-926.
- JØRGENSEN, B.B. 1977. The sulfur cycle of a coastal marine sediment (Limjorden, Denmark). *Limnol. Oceanogr.* 22:814-832.
- JØRGENSEN, B.B. 1978. A comparison of methods for quantification of bacterial sulfate reduction in coastal marine sediments. I. Measurement with radiotracer techniques. *Geomicrobiol. J.* 1: 11-27.
- JØRGENSEN, B.B. 1979. Microbial transformations of sulfur compounds in a stratified lake (Solar lake, Sinai). *Limnol. Oceanogr.* 24:799-822.
- JØRGENSEN, B.B. & T. FENCHEL. 1974. The sulfur cycle of a marine sediment model system. *Mar. Biol.* 24:189-201.
- JULIÀ, R. 1980. La conca lacustre de Banyoles-Besalú. Monografies del Centre d'Estudis Comarcals de Banyoles.
- KAISER, P. 1966. Contribution a l'étude de l'écologie des bactéries photosynthétiques. *Ann. Inst. Pasteur* 111:733-774.
- KARL, D.M., J.A. HAUGSNESS, L. CAMPBELL & O. HOLM-HANSEN. 1978. Adenine nucleotide extraction from multicellular organism and beach sand: ATP recovery, energy charge ratios and determination of carbon/ATP ratios. *J. exp. mar. Biol. Ecol.* 34:163-181.

- KEPKAY, P.E., R.C. COOKE & J.A. NOVITSKY. 1979. Microbial autotrophy: a primary source of organic carbon in marine sediments. *Science* 204:68-69.
- KIRK, J.T.O. 1977a. Use of a quanta meter to measure attenuation and underwater reflectance of photosynthetically active radiation in some inland and coastal south-eastern Australian waters. *Aust. J. Mar. Freshwater Res.* 28:9-21.
- KIRK, J.T.O. 1977b. Attenuation of light in natural waters. *Aust. J. Mar. Freshwater Res.* 28:497-508.
- KLUYVER, A.J. & C.B. VAN NIEL. 1956. The microbe's contribution to biology. Harvard University Press, Cambridge, USA.
- KOBAYASHI, M. 1975. Role of photosynthetic bacteria in foul water purification. *Progress in Water Technology* 7:309-315.
- KOBAYASHI, M., M. KOBAYASHI & H. NAKANISHI. 1971. Construction of a purification plant for polluted water using photosynthetic bacteria. *J. Ferment. Technol.* 49:817-825.
- KOBAYASHI, M. & Y.T. TCHAN. 1973. Treatment of industrial waste solutions and production of useful by-products using a photosynthetic bacterial method. *Water Res.* 7:1219-1224.
- KONDRATIEVA, E.N. 1965. Photosynthetic bacteria. Israel Program Sci. Transl. Jerusalem.
- KONDRATIEVA, E.N. 1979. Interrelation between modes of carbon assimilation and energy production in photosynthetic purple and green bacteria. En J.R. Quayle (ed), *Microbial biochemistry*, v. 21. University Park Press, Baltimore.
- KUZNETSOV, S.I. 1977. Trends in the development of ecological microbiology. En M.R. Droops & H.W. Jannasch (eds.). *Advances in aquatic microbiology*. v. 1, Academic Press, New York.
- LAPAGE, S.P. & J.E. SHELTON. 1970. Media for the maintenance and preservation of bacteria. En J.R. Norris & D.W. Ribbons (eds.), *Methods in microbiology* v. 3A. Academic Press, New York.
- LARSEN, H. 1954. The photolitho-autotrophic bacteria and their energy relations. *Symp. Soc. Gen. Microbiol.* 4:186-201.
- LAWRENCE, J.R., R.C. HAYNES & U.T. HAMMER. 1978. Contribution of photosynthetic bacteria to total production in a meromictic saline lake. *Verh. Internat. Verein. Limnol.* 20:201-207.

- LIAAEN-JENSEN, S., E. HEDGE & L.M. JACKMAN. 1964. Bacterial carotenoids of photosynthetic green bacteria. *Acta Chem. Scand.* 18. 1703-1718.
- LIPPERT, K.D. & N.PFENNIG. 1969. Die Verwertung von Molekularen wasserstoff durch Chlorobium thiosulfatophilum. *Arch. Microbiol.* 65:29-47.
- LOWRY, O.H., N.J. ROSEBROUGH, A.L. FARR & R.J. RANDALL. 1951. Protein measurement with the Folin phenol reagent. *J. Biol. Chem.* 193:265-275.
- LUMPKINS, E.D. & J.S. ARVESON. 1968. Improved technique for staining bacteria on membrane filters. *Appl. Environment. Microbiol.* 16:433-434.
- LÜNING, K. & M.J. DRING. 1979. Continous underwater light measurement near Helgoland (North Sea) and its significance for characteristic light limits in the sublittoral region. *Helgoländer Wiss. Meeresunters.* 32:403-424.
- LYALIKOVA, N.N. 1957. A study of the assimilation of free carbon dioxide by purple bacteria in lake Belovod. *Microbiology* 26: 97-103.
- MADIGAN, M.T. & T.D. BROCK. 1976. Quantitative estimation of bacteriochlorophyll c in the presence of chlorophylla in aquatic environments. *Limnol. Oceanogr.* 21:462-467.
- MADIGAN, M.T. & T.D. BROCK. 1977. Adaptation by hot spring phototrophs to reduced light intensities. *Arch. Microbiol.* 113: 111-120.
- MARGALEF, R. 1946. Materiales para el estudio del lago de Banyoles (Gerona). *P. Inst. Biol. Apl.* 1:27-78.
- MARGALEF, R. 1978. Life-forms of phytoplankton as survival alternatives in an unstable environment. *Oceanol. Acta* 1:493-509.
- MATHERON, R. & R. BAULAIGUE. 1976. Bactéries fermentatives, sulfatoréductrices et phototrophes sulfureuses en cultures mixtes. *Arch. Microbiol.* 109:319-320.
- MATHERON, R. & R. BAULAIGUE. 1977. Influence de la pénétration de la lumière solaire sur le développement des bactéries phototrophes sulfureuses dans les environments marins. *Can. J. Microbiol.* 23:267-270.

- MATHERON, R. & R. BAULAIGUE. 1980. Influence de l'intensité lumineuse sur la teneur en bacteriochlorophylle et sur la croissance de sulfatobactéries phototrophes marines. *Can. J. Microbiol.* 26:464-467.
- MATSUMO, K. 1978. Evolution of dissipative system: A theoretical basis of Margalef's principle on ecosystem. *J. Theor. Biol.* 70:23-31.
- MECHLER, B. & J. OELZE. 1978a. Differentiation of the photosynthetic apparatus of Chromatium vinosum strain D. I. Influence of growth conditions. *Arch. Microbiol.* 118:91-97.
- MECHLER, B. & J. OELZE. 1978b. Differentiation of the photosynthetic apparatus of Chromatium vinosum strain D. II. Structural and functional differences. *Arch. Microbiol.* 118:99-108.
- MIRACLE, M.R. 1974. Niche structure in freshwater zooplankton: a principal component approach. *Ecology* 55:1306-1316.
- MONTESINOS, E. 1978. Biomasa y actividad de las bacterias fotosintéticas en dos medios acuáticos de diferente nivel trófico (Banyoles y Sisó). Tesina de Licenciatura, Universidad Autónoma de Barcelona.
- MÜLLER, H.E. 1977. Observations of interactions between water and sediment with a 30 kHz sediment echosounder. En H.L. Golterman (ed), *Interactions between sediments and freshwater*. Dr. W. Junk, La Haya.
- MUR, L.R., H.J. GONS & L. VAN LIERE. 1977. Some experiments on the competition between green algae and blue-green bacteria in light-limited environments. *FEMS Microbiol. Letters* 1:335-338.
- NEUMANN, J. 1959. Maximum depth and average depth of lakes. *J. Fish. Res. Board Can.* 16:923-927.
- NEWCOMBE, C.L. & J.V. SLATER. 1950. Observations on the conditions of existence of a green sulphur bacterium in Sodon Lake, south-eastern Michigan. *Trans. Am. Microscop. Soc.* 69:172-178.
- ODUM, E.P. 1971. *Fundamentals of ecology*. W.B. Saunders, Philadelphia.
- OHLE, W. 1954. Sulfat als "katalysator" des limnischen Stofkreislaufes. *Vom Wasser* 21:13-32.

- OSNITSKAYA, L.K. 1965. Photosynthetic development of the purple sulfur bacteria Chromatium vinosum in narrow ranges of the spectrum. *Microbiology* 34:170-173.
- OSNITSKAYA, L.K. & V.I. CHUDINA. 1977. Possible application of light of different wavelenght for growth of Chromatium vinosum under heterotrophic conditions. *Microbiology* 46:612-618.
- OVERBECK, J. 1974. Microbiology and biochemistry. *Mitt. Internat. Verein Limnol.* 20:198-228.
- OVERBECK, J. 1977. Distribution pattern of phytoplankton and bacteria, microbial decomposition of organic matter and bacterial production in eutrophic, stratified lake. En Z. Kajak & A. Hillbricht-Ilkowska (eds.). Productivity problems of freshwaters. Warszawa-Kraków.
- PALLÍ, L. & J. TRILLA. Morfogénesis del Valle de Sant Miquel de Campmajor. Tomo homenaje Dr. L. Solé Sabarís (en prensa).
- PARK, R.W.A. 1977. Musing on the value of attempting to identify the bacteria from water. *Proc. Soc. Gen. Microbiol.* 4:123.
- PARMA, S. (ed.). 1978. Limnological Institute. Progress Report 1978, Vijverhof and Tjenkemeer Lab. Holanda.
- PARSONS, T.R. & J.D.H. STRICKLAND. 1963. Discussion on spectrophotometric determination of marine-plant pigments, with revised equations for ascertaining chlorophylls and carotenoids. *J. Mar. Res.* 21:155-163.
- PFENNIG, N. 1965. Anreicherungskulturen für Röte und Grüne Schwefelbakterium. *Zentralb. Bakteriol Parasitenkd. Infektionskr. Hyg. Abt 1. Suppl.* 1:179-189.
- PFENNIG, N. 1967. Photosynthetic bacteria. *Annu. Rev. Microbiol.* 21:285-324.
- PFENNIG, N. 1975. The phototrophic bacteria and their role in the sulfur cycle. *Plant soil* 43:1-16.
- PFENNIG, N. 1977. Phototrophic green and purple bacteria: a comparative systematic survey. *Annu. Rev. Microbiol.* 31:275-290.
- PFENNIG, N. 1978. General physiology and ecology of photosynthetic bacteria. En R.K. Clayton & W.R. Sistrom (eds.), *The photosynthetic bacteria*. Plenum Press, New York.

- PFENNIG, N. & H.G. TRÜPER. 1974. The phototrophic bacteria. En R.E. Buchanan & N.E. Gibbons (eds), Bergey's manual of determinative bacteriology. The Williams & Wilkins Co. Baltimore, 8a. ed.
- PLANAS, D. 1973. Composición, ciclo y productividad del fitoplancton del lago de Banyoles. *Oecol. Aquatica* 1:3-106.
- POSTGATE, J.R. 1963. Versatile medium for the enumeration of sulfate reducing bacterium. *Appl. Environ. Microbiol.* 11:265-267.
- POTTS, M. & B.A. WHITTON. 1979. pH and Eh on Aldabra atoll. 2. Intertidal photosynthetic microbial communities showing zonation. *Hydrobiologia* 67:99-105.
- REDFIELD, A.C., B.H. KETCHUM & F.A. RICHARDS. 1963. The influence of organisms on the composition of seawater. En M.N. Hill (ed), *The Sea*, v. 2. Wiley-Interscience, New York.
- RICHARDS, F.A. 1965. Anoxic basins and fjords. En J.P. Riley & G. Skirrow (eds), *Chemical oceanography*, v. 1, Academic Press, New York.
- ROEMER, S.C. & K.D. HOAGLAND. 1979. Seasonal attenuation of quantum irradiance (400-700 nm) in three Nebraska reservoirs. *Hydrobiologia* 63:81-92.
- ROMANENKO, V.I., M. PEREZ-EIRIS, V.M. KUDRYAVTSEV & M.A. PUBLIENNES. 1976. Microbiological processes in meromictic lake Valle de San Juan. Cuba. *Microbiology* 45:466-472.
- RUDD, J.W.M. & R.D. HAMILTON. 1973. Measurement of adenosine triphosphate in two precambrian lakes of northwestern Ontario. *J. Fish. Res. Board. Can.* 30:1537-1546.
- RUTTNER, F. 1937. Limnologische Studien an einigen Seen der Ostalpen. *Arch. Hydrobiol.* 32:167-319.
- RUTTNER-KOLISKO, A. 1975. The vertical distribution of plankton rotifers in a small alpine lake with a sharp oxygen depletion (Lunzer Obersee). *Verh. Internat. Verein. Limnol.* 19:1286-1294.
- SAKAMOTO, M. & K. HOGETSU. 1963. Spectral change of light with depth in some lakes and its significance to the photosynthesis of phytoplankton. *Plant. Cell Physiol.* 4:187-198.

- SAN MIGUEL, M. & J. MARCET. 1926. Region volcanique d'Olot. Exc. C.4. XIV Congr. Geol. Intern., Madrid.
- SAVIDGE, G. 1978. Variations in the progress of  $^{14}\text{C}$  uptake as a source of error in estimates of primary production. Mar. Biol. 49:295-301.
- SCHINDLER, D.W., R.V. SCHMIDT & R.A. REID. 1972. Acidification and bubbling as an alternative to filtration in determining phytoplankton production by  $^{14}\text{C}$  method. J. Fish. Res. Board Can. 29:1627-1631.
- SCHMIDT, G.L. & M.D. KAMEN. 1970. Variable cellular composition of Chromatium in growing cultures. Arch. Microbiol. 73:1-19.
- SHIBATA, K., A.A. BENSON & M. CALVIN. 1954. The absorption spectra of suspensions of living microorganisms. Biochim. Biophys. Acta 15:461-470.
- SIEBURTH, J.M. 1979. Sea microbes. Oxford University Press, Oxford.
- SIEFERT, E., R.L. IRGENS & N. PFENNIG. 1978. Phototrophic purple and green bacteria in a sewage treatment plant. Appl. Environ. Microbiol. 38:44.
- SIREVAG, R. 1975. Photoassimilation of acetate and metabolism of carbohydrate in Chlorobium thiosulfatophilum. Arch. Microbiol. 104:105-111.
- SIREVAG, R. & J.G. ORMEROD. 1977. Synthesis, storage and degradation of polyglucose in Chlorobium thiosulfatophilum. Arch. Microbiol. 111:239-244.
- SMITH, J.H. & A. BENITEZ. 1955. Chlorophylls. Analysis in plant materials. In Modern methods of plant analysis. v. 4. Springer-Verlag, Heidelberg.
- SOLE SABARÍS, L. 1958. Geografía de Cataluña. Aedos, Barcelona.
- SOLÓRZANO, L. 1969. Determination of ammonia in natural waters by the phenol hypochlorite method. Limnol. Oceanogr. 14:799-801.
- SØRENSEN, J., B.B. JØRGENSEN & H.P. REVSBÆCH. 1979. A comparison of oxygen, nitrate and sulfate respiration in coastal marine sediments. Microbial Ecology 5:105-115.
- SOROKIN, Y.I. 1965. On the trophic role of chemosynthesis and bacterial biosynthesis in water bodies. Mem. Ist. Ital. Idrobiol. Suppl. 18:187-205.

- SOROKIN, Y.I. 1970. Interrelations between sulfur and carbon turnover in meromictic lakes. *Arch. Hydrobiol.* 66:391-446.
- SOROKIN, Y.I. & N. DONATO. 1975. On the carbon and sulfur metabolism in the meromictic lake Faro (Sicily). *Hydrobiologia* 47:241-252.
- SOROKIN, Y.I. & H. KADOTA (eds.). 1972. Techniques for the assessment of microbial production and decomposition in fresh waters. IBP n° 23. Blackwell, Oxford.
- STANIER, R.Y. & J.H.C. SMITH. 1960. The chlorophylls of green bacteria. *Biochim. Biophys. Acta* 41:478-484.
- STEEMANN-NIELSEN, E. 1952. The use of radioactive carbon ( $^{14}\text{C}$ ) for measurement of organic production in the sea. *J. Cons. Expl. Mer* 18:117-140.
- STEEMANN-NIELSEN, E. 1962. On the maximum quantity of plankton chlorophyll per surface unit of lake. *Int. Rev. ges. Hydrobiol.* 47:333-338.
- STEPHANOPOULOS, G. & A.G. FREDRICKSON. 1979. Coexistence of photosynthetic microorganisms with growth rates depending on the spectral quality of light. *Bull. Math. Biol.* 41:525-542.
- STEPHANOPOULOS, G., A.G. FREDRICKSON & R. ARIS. 1979. The growth of competing microbial populations in a CSTR with periodically varying inputs. *AIChE J.* 25:863-872.
- STRICKLAND, J.D.H. & T.R. PARSONS. 1968. A practical handbook of seawater analysis. *Bull. Fish. Res. Board Can.*, 167.
- TAKAHASHI, M. & S. ICHIMURA. 1968. Vertical distribution and organic matter production of photosynthetic sulfur bacteria in Japanese lakes. *Limnol. Oceanogr.* 13:644-655.
- TAKAHASHI, M. & S. ICHIMURA. 1970. Photosynthetic properties and growth of photosynthetic sulfur bacteria in lakes. *Limnol. Oceanogr.* 15:924-944.
- TAKAHASHI, M., K. SHIOKAWA & S. ICHIMURA. 1972. Photosynthetic characteristics of a purple sulfur bacterium grown under different light intensities. *Can. J. Microbiol.* 18:1825-1828.
- TALLING, J.F. 1960. Self-shading effects in natural populations of a planktonic diatom. *Wetter und Leben* 12:235-242.

- THOMPSON, M.J., L.E. GILLILAND & L.K. ROSENFELD. 1979. Light scattering and extinction in a highly turbid coastal inlet. *Estuaries* 2:164-171.
- TRENTINI, W.C. & M.P. STARR. 1967. Growth and ultrastructure of Rhodomicrobium vanniellii as a function of light intensity. *J. Bacteriol.* 93:1699-1704.
- TRILLA, J., M. SANZ & L. PALLÍ. 1979. Aplicación de un modelo de mezcla total en acuífero cárstico. Com. II Simp. Nac. Hidrogeología, Pamplona. pp. 451-463.
- TRÜPER, H.G. & S. GENOVESE. 1968. Characterization of photosynthetic sulfur bacteria causing red water in lake Faro (Messina, Sicily). *Limnol. Oceanogr.* 13:225-232.
- TRÜPER, H.G. & N. PFENNIG. 1978. Taxonomy of the Rhodospirillales. En R.K. Clayton & W.R. Sistrom (eds.), *The photosynthetic bacteria*. Plenum Press, New York.
- TRÜPER, H.G. & C.S. YENTSCH. 1967. Use of glass fiber filter for the rapid preparation of in vivo absorption spectra of photosynthetic bacteria. *J. Bacteriol.* 94: 1255-1256.
- UTERMÖHL, H. 1925. Limnologische Phytoplanktonstudien Die Besiedelung osthsteinischer Seen mit Schwebpflanzen. *Arch. Hydrobiol. Suppl.* 5:1-527.
- VAN GEMERDEN, H. 1967. On the bacterial sulfur cycle of inland waters. Tesis doctoral, Universidad de Leiden.
- VAN GEMERDEN, H. 1968. On the ATP generation by Chromatium in darkness. *Arch. Microbiol.* 64:118-124.
- VAN GEMERDEN, H. 1974. Coexistence of organisms competing for the same substrate: an example among the purple sulfur bacteria. *Microbial Ecology* 1:104-119.
- VAN GEMERDEN, H. 1980. Survival of Chromatium vinosum at low light intensities. *Arch. Microbiol.* 125:115-121.
- VAN GEMERDEN, H. & H.H. BEEFTINK. 1978. Specific rates of substrate oxidation and product formation in autotrophically growing Chromatium vinosum cultures. *Arch. Microbiol.* 119:135-143.
- VAN LIERE, L., G.J. DE GROOT & L.R. MUR. 1979. Pigment variation with irradiance in Oscillatoria agardhii Gomont in nitrogen (nitrate)-limited chemostat cultures. *FEMS Microbiol. Letters* 6:337-340.

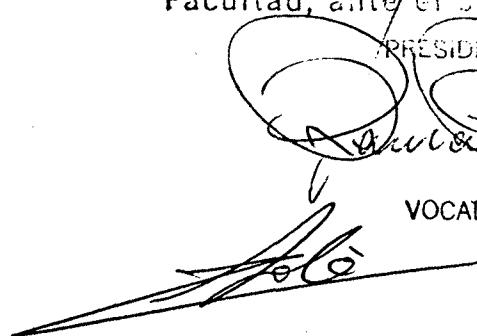
- VAN NIEL, C.B. 1971. Techniques for the enrichment, isolation and maintenance of the photosynthetic bacteria. En A. San Pietro (ed), Methods in enzimology, v. 23A. Academic Press, New York.
- VIDAL, L.M. 1908. Investigaciones de hidrología subterránea en la comarca de Bañolas (provincia de Gerona). Mem. de la Real Academia Ciencias y Artes de Barcelona. 3a. ep., vol. VII: 339-355.
- VIDAL PARDAL, M. 1954. Los yesos de la comarca de Bañolas (Gerona). Min. Obr. Publ. Jef. Sond. Cim. Inf. Gral., Bol. 26-28.
- VIDAL PARDAL, M. 1960. La alimentación subterránea del lago de Banyoles y algunos datos sobre los depósitos lacustres de sus inmediaciones. Bol. Serv. Geol. O.P. nº 7. Madrid.
- VOLLENWEIDER, R.A. (ed). 1974. Primary production in aquatic environments. Blackwell, Oxford.
- WALKER, K.F. & G.E. LIKENS. 1975. Meromixis and a reconsidered typology of lake circulation patterns. Verh. Internat. Verein. Limnol. 19:442-458.
- WESSELS, C. & E. BIRNBAUM. 1979. An improved apparatus for use with the  $^{14}\text{C}$  acid-bubbling method of measuring primary production. Limnol. Oceanogr. 24:187-188.
- WETZEL, R.G. 1973. Productivity investigations of interconnected marl lakes. I. Hydrogeological studies 3. Academia Publishing House, Praga.
- WINOGRADSKY, S. 1949. Microbiologie du sol. Problèmes et méthodes. Masson, París.
- YENTSCH, C. 1967. The measurement of chloroplastic pigments, thirty years of progress? En H.L. Golterman & R.S. Clymo (eds.), Chemical environment in the aquatic habitat. N.V. Noord-Hollandsche Uitgevers Maats-chappifj, Amsterdam.
- YLLA, J. 1980. Actividad sulfatorreductora en el sedimento de distintas masas de agua de Banyoles y Sant Miquel de Campmajor (Girona). Tesina de Licenciatura, Universidad Autónoma de Barcelona.
- ZOBELL, C. 1946. Studies on redox potential of marine sediments. Bull. Am. Assoc. Petrol. Geologist 30:477-513.

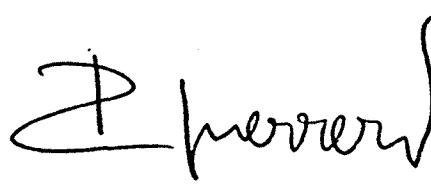
UNIVERSIDAD AUTONOMA DE BARCELONA  
FACULTAD DE CIENCIAS

Leída la presente Memoria el dia 6...  
de Octubre de 1980, en esta  
Facultad, ante el siguiente Tribunal

PRESIDENTE

VOCALES

  
A. Valls i Alou  
  
M R Miracle

  
D. Ferrer   
R. Margall





Universitat Autònoma de Barcelona

Servei de Biblioteques

Reg. 224583

Sig. T UAB / 2698

Ref. 12500

