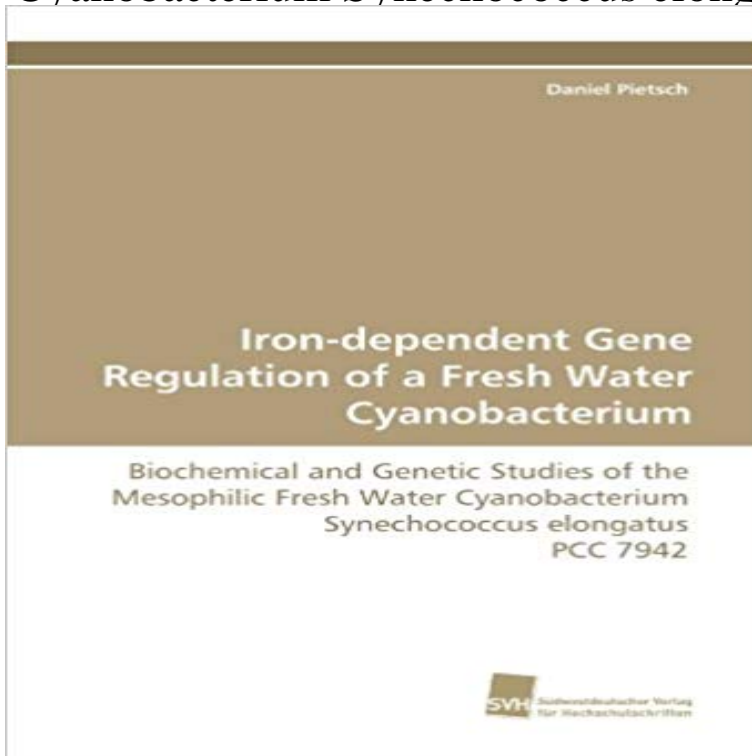


Iron-dependent Gene Regulation of a Fresh Water Cyanobacterium: Biochemical and Genetic Studies of the Mesophilic Fresh Water Cyanobacterium *Synechococcus elongatus* PCC 7942



The absolute requirement for iron as a cofactor of oxygenic photosynthetic life-style is in sharp contrast to the severely limited bioavailability of iron. This situation is partly caused by the fact that the photosynthetic and the respiratory electron transport systems contain a high number of iron-containing compounds. Investigations of *Synechococcus elongatus* PCC 7942 revealed that acclimation to iron starvation includes various physiological alterations. Iron acquisition becomes strongly improved by expression of two further novel putative iron uptake systems. In addition, permeability of the outer membrane becomes up-shifted by a modified expression of outer membrane porins. Sophisticated modifications of the electron transport systems lead to a decreased photosynthetic linear and an increased photosynthetic cyclic and respiratory electron transport. The potential switch to an alternative recruitment of ATP contributes additionally to the acclimation to iron limitation. This process is complemented by the up-regulation of aerobic respiration via expression of a novel NDH-1 subunit and down-regulation of other important cellular functions such as the assimilation of nitrogen.

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