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Contribution to the discussion on the nonregulatory nonphotochemical quenching

LETTER TO THE EDITOR

Response to the article by Győző Garab in Photosynthetica (DOI: 10.32615/ps.2024.022) with the title: Revisiting the nonregulatory, constitutive nonphotochemical quenching of the absorbed light energy in oxygenic photosynthetic organisms

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First and foremost, I wholeheartedly agree with Prof. Győző Garab conclusions and the key points he has highlighted in his article. His approach to "thinking out loud" resonates deeply with me, and I share many of his concerns and insights. Perhaps my views are somewhat unexpected given my primary focus on photosynthesis and chlorophyll fluorescence, but I believe they are worth considering.

In my extensive experience studying photosynthesis – particularly through measurements of O_2 evolution, CO_2 uptake, and chlorophyll fluorescence – I have come to realize that many widely accepted facts in our field warrant careful re-examination since they have been built, in the most cases, on **assumptions**. This is especially true when it comes to chlorophyll fluorescence. Over the years, I have developed significant doubts about the prevailing frameworks and models. For example, a striking observation is the lack of fixed numbers or percentages in the literature, regarding the fate of light energy used by photosynthesizing organisms – whether it be absorption, reabsorption, reflection, transmission, re-emission, or loss. Furthermore, verifying our theories with alternative techniques and methods remains a significant challenge.

In light of these uncertainties, I have recently shifted my approach to using chlorophyll fluorescence data without necessarily interpreting their exact meaning or origin (numbers that come out from plants). By leveraging artificial intelligence (AI) and machine learning (ML), I am monitoring and predicting any ecosystem dynamics remotely, noninvasively, and in real-time. This innovative approach is designed to prevent and mitigate ecological catastrophes, conserve energy (electricity and heating systems), and develop biological feedback systems that enable plants to regulate their growth and development environments more effectively. Essentially, we are beginning to decode these signals as the plant language "Plantish" facilitating a more harmonious coexistence between humans and plants.

Currently, my research efforts are focused on several groundbreaking projects. One involves light control in greenhouses, as showcased in this video: https://www.youtube.com/watch?v=xza3veM7z6I.

Another project aims to identify nutrient deficiencies in crops at an early stage, which you can read about here: https://www.sggw.edu.pl/en/sggw-scientists-work-on-an-innovative-system-for-determining-the-mineral-requirements-of-plants.

Additionally, leveraging my four decades of experience with both computerized and hand-held devices, I am pioneering the world's first "ecological ambulance". This system primarily uses photosynthesis measurements, employing various techniques to monitor plant health and prevent ecological disasters. More details can be found here: https://www.sggw.edu.pl/en/monitoring-of-photosynthesis-can-prevent-ecological-disasters.

All three above mentioned initiatives are currently undergoing the patent application process.

In conclusion, I firmly believe that it is time for us to revisit and apply our extensive knowledge of photosynthesis in new and innovative and practical ways in industry, sport, food production, space and others. The potential benefits for both ecological conservation and agricultural productivity are also immense.

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