

I just thought I would add my tuppence worth to this discourse, which I have been following closely.

The following are a few important points:

- 1. One aspect that appears to have upset our erstwhile Sri Lankan colleagues is Dr. Chandre Dharmawardana's observation that the discipline of "Biofilm-Bio-fertilizers" with bacterial and fungal inocula "is in its infancy". I have to agree with Dr. CW. Even after 20 years, the subject is nowhere near proving "cause-and-effect" and resolution, although there is palpable global interest in "eco-friendly" options that might work to reduce the global consumption of synthetic and mineral fertilizers.
- 2. Weed Scientists (like me and Buddhi) know that Allelopathy, too, went through a period of about 40 years plus, before "cause-and-effect" could be confirmed. This is somewhat similar. Understanding often "lags a long way behind" practical applications. Allelopathic leaf extracts and concoctions have also been long touted as "botanical herbicides". Not a single one works on a commercial scale. The discipline, though, and allelochemicals in particular, have been "templates" to produce several well-known herbicides, which act in ways very similar to other bio-degradable "Natural Products". The interest also transformed some research approaches, methods, techniques of phyto-extraction and chemical characterization. It also brought different groups of scientists together in collaborative efforts.
- 3. Pelargonic Acid, as a "Natural Herbicide" got a mention somewhere in this discourse. It is a good example of a "Natural Product" (from Pelargonium spp. or Geranium spp). However, not a drop of these plant extracts are commercialized; it is simply too ineffective and too dilute in plant extracts for a commercial product. Therefore, Pelargonic Acid is fully "chemically synthesized" and is still one of the most expensive herbicides in the market (about US \$ 300 for a 10 L pack]. I know the Company well.
- 4. The two latest books on Bi-Fertilizers (both in 2021) say that the discipline is "NEW", "promising" and "developing". I have attached jpgs of the Books for people to be aware that these are just out of print.
- 5. In these two Books, notably, all are Indian, Pakistan or Mexican contributors; All Editors are Indian. It shows an interest in the sub-continent and possibly, Central and South America.
- 6. The books are quite expensive (\$ 2500-\$ 360 range). Hardly out of print, one is being offered today at 50%! Maybe, time to buy? Even a cursory look at the Chapter Abstracts show how much is unknown. It is clearly an emerging field with some potential. Many other disciplines have gone through such an "early-phase" of great enthusiasm but some clearly did not make it to the end. Allelopathy and allelochemicals are perfect examples., from Weed Science.
- 7. There are several other Indian reviews on "Bio-Fertilizers" - if you Google, you will find them. These "review" articles are now commonplace. They provide useful pointers and directions but do not necessarily ask the critical questions - how and why, or have clear answers.

- 8. Nevertheless, I am attaching two recent articles from reputed journals, which landed on me. One is from the most prestigious *Nature*; they show only one thing - it is an emerging field of science. Our SL colleagues claim that they've been doing the studies for about 20 years and have Dept of Agric recommendations, too. Good on them. You can make your own mind up when you read these compelling articles.
- 9. In the articles Dr. Gamini attached (Thanks for those) - may I suggest the studies report YIELDS of the crops? Whether it be tea grown for 8 months (TRI study), or rice grown for 3-4 months (district-based field studies), the crop yield parameter is critical to report on, along with other presumed and/or demonstrable soil health improvements. I did not see yield improvements in the two Abstracts presented at Peradeniya. Nor did I see the TRI study continuing to Yield parameters. **Please correct me if I am wrong.**
- 10. I can only see yields in that SL Journal of Science paper (Rice yield under BFBF increased over CF but not by much). The data are presented in a complicated way in the paper, which makes it hard to follow or agree with the authors' conclusions. I am almost certain some other journal would have asked for the raw data to be differently analyzed and presented. The authors' conclusions may then become a bit more ambiguous.
- 11. This paper would have also benefited if "cause-and -effects" were discussed (i.e. nutrient transformations and "mineralization" processes in the soil; how might have the BFBF acted in this rather large field acted? Were they the primary cause of N, P, C or any other transformation? in the highly variable rice paddies, across geographically different soils - what other factors came into play?]
- 12. I encourage you to anchor your future "biological" studies on BFBF to capture crop yields and other crop quality or plant vigour parameters. The *Nature* article shows that very clearly. It starts with Tomato yields and yield parameters. **I am pretty sure, at the PGIA and other places, such studies may have been done in SL, in different crops, with BFBF. But I have not come across such articles. Please send - if you or your students have done them - for my information.**
- 13. Given that the fungal biomass in soil, including Trichoderma spp. far outweigh the bacterial biomass, perhaps, more attention should be given to the role fungi play in all of this. Again, such studies may have been done in the past. But in the field of BFBF, transformations that might be driven by fungi deserve more critical assessment.

I conclude respectfully that my contribution should be taken in the right spirit.

Please check out the FEW attachments I've provided.

The "expats" are a much-maligned community, although, as I wrote in my "Bogus Professors" recent article in the CT and FT - some are among the

brightest stars in various global spheres and endeavours, who have made a significant contribution to keeping Sri Lanka's name in the minds of the global community.

If you need any clarifications on the above, or seek to quote me - please let us have a civilized conversation.

Kind Regards and Thanks
NIMAL