



INSTITUTE OF FOREST BIODIVERSITY (IFB), HYDERABAD

August, 30th, 2021

A Report on Seminar by Shri Kavi Sidharthan, Sc-B, Hyderabad held on 30th August, 2021.

As part of the seminar series, a seminar on “Balancing at survival’s edge: Toxin – Antitoxin system in Bacteria and its implications for plant disease” has been organized on 30/08/2021 in the Conference Hall of the Institute of Forest Biodiversity, Hyderabad. The seminar started with a brief introduction on the topic by Shri E. Venkat Reddy, IFS, Head Extension Division, IFB, Hyderabad. The speaker of this seminar was Shri Kavi Sidharthan, Sc-B, IFB, Hyderabad. A total of 15 members of officials from IFB participated in the seminar.

The seminar started with a brief introduction and the detailed presentation includes:

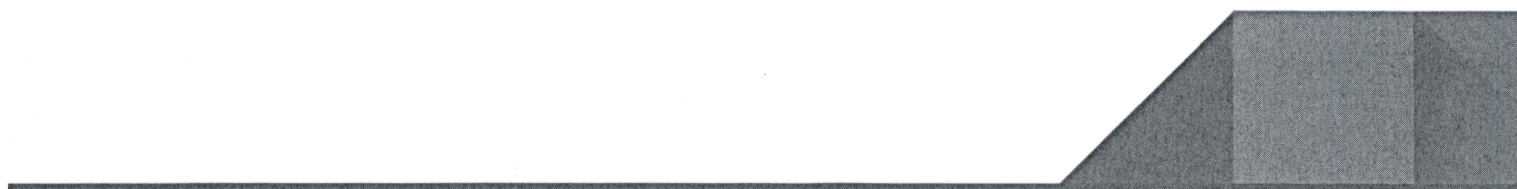
Toxin-Antitoxin (TA) systems in bacteria are operons that contain toxin and antitoxin coding genes. The toxin is relatively more stable than the antitoxin and the latter binds to and stabilizes the toxin under normal conditions. Under stress conditions, the antitoxin is selectively degraded allowing the free toxin to inhibit various cellular processes thereby retarding the growth of the bacteria. TA modules are widely distributed in bacterial plasmids, chromosomes and phages.

Depending on the nature of toxin-antitoxin and their mode of action, TA systems are classified into six types. Web based tools like TA finder and RASTA Bacteria can be used for prediction of type II TA system based on conserved domains and gene organization. Though initially presumed to be DNA maintenance modules, TA systems play role in anti-addiction, bacterial virulence, biofilm formation, antiphage activity and persister formation. TA systems can be exploited in plant disease management by deploying antipersister strategies that prevent the entry of bacteria into persister state. Alternatively, by enhancing persister in bacterial bio-agent formulations, the field stability of bio agents can be improved (Shidore and Triplett, 2017). As a case study, the role of MqsRA system in fitness, pathogenicity and biofilm formation in *Xylella fastidiosa* (Merfa et al., 2016) was discussed.

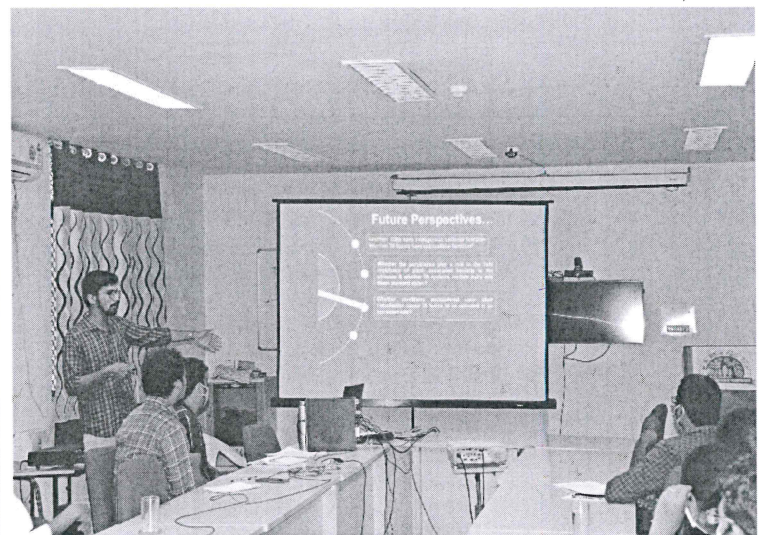
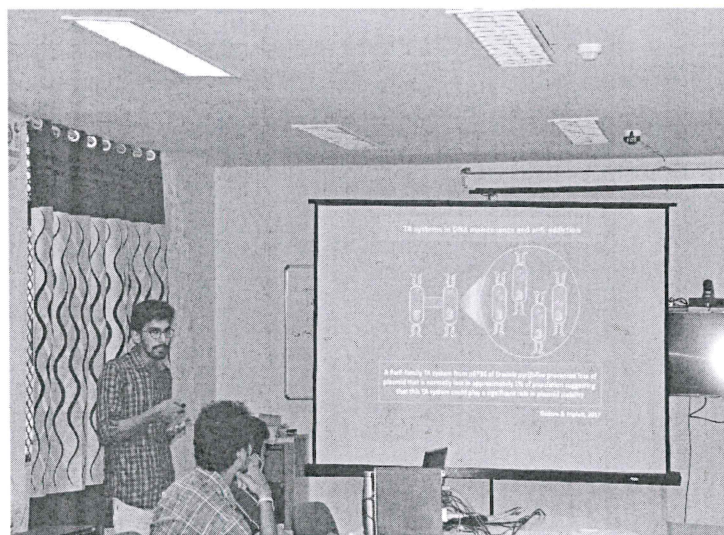
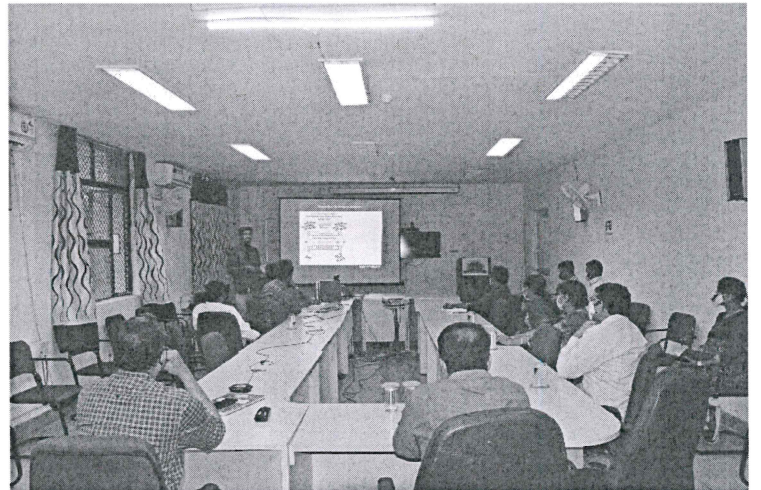
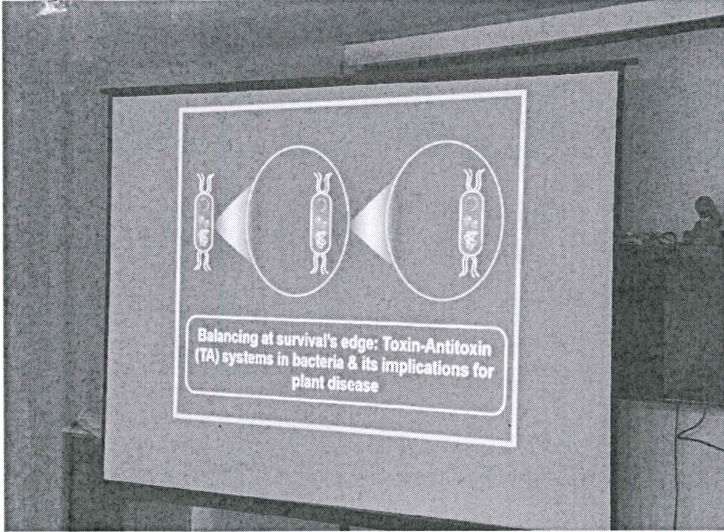
References

- Merfa, M. V., Niza, B., Takita, M. A., & De Souza, A. A. (2016). The MqsRA toxin-antitoxin system from *Xylella fastidiosa* plays a key role in bacterial fitness, pathogenicity, and persister cell formation. *Frontiers in microbiology*, 7, 904.
- Shidore, T., & Triplett, L. R. (2017). Toxin-antitoxin systems: implications for plant disease. *Annual review of phytopathology*, 55, 161-179.

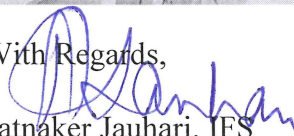
The overall program is coordinated by Shri E. Manikanta Reddy, Technician, Extension Division.



Glimpses of the Seminar



With Regards,


Dr. Ratnaker Jauhari, IFS
Director