Webinar Q&A
Soil Metagenome Insights: An Emerging Frontier in Sustainable Agriculture
9 September 2024

Presenter: Prasanna Kankanala
Director, R&D
Trace Genomics, USA

The webinar recording is available on the Phytobiomes Alliance YouTube channel at https://youtu.be/-SsPA_4GVPE

Q: For indigeneity reports for APHIS reporting, how does the Trace Genomic platforms assess the taxonomy of a given microbe (e.g. 16S, multi-locus gene alignment, ANI, etc)?

Timestamp: 45'25"

Q: what impact do soil properties have on the accuracy and reliability of metagenomic results?

Timestamp: 48'20"

Q: How well does the genetic potential of the microbiome actually correlate with activity?

Timestamp: 51'00"

We have done validations for several of the indicators to test this. Under otimal weather conditions, we have been seeing the activity.

Q: can you describe the soil sampling methodology, and is this something done by the farmer themselves or need to hire a consultant or have trace come out?

Timestamp: 53'00"

If the protocol demands true rhizophere, then it has to be a destructive process. Our customers send us bulk soils post harvest or pre planting to understnd the soil potentil to make decisions at the farmgate.

Q: Due to the high abundance and diversity of microorganisms in soil systems, are you able to recover all that diversity? are you able to close genomes with your pipeline? which is the sequencing depth effort needed to do metagenomics in soils?

Timestamp: 54'30"

Q: what is the nitrogen use efficiency indicator that you used?

Timestamp: 58'20"

Q: are there specific microbial communities that can serve as indicators for optimal application timing and frequency of biological products?

Timestamp: 59'00"

Q: How can one integrate microbiomes and microbiome data into farming practices as products ? What about their acceptability

TracePHOS and TraceN are examples of integrating microbiome data into farming practices. Educating the growers with this technology and its impact is a major responsibility that will assist in adoption of such technologies

Q: what is the most challenging to apply bioinoculant (biopesticide/biofertilizer) into the field? and how to boost beneficial microbe to increase soil health?

There are different factors like - form of biostimulant, farming equipment, logistics, timing etc. These are very dependent on the type of biostimilant products.

Q: How well does this analysis correlates with actual outcomes?

Our customers have been seeing ROI by adopting this technology. I presented a couple case studies on the call.

Q: can you say anything about how biochar additions to soil may affect your test & results

I don't have experience working with biochar.

Q: for example for nutrient use efficiency analysis how long will take to receive results from the analysis?

Our TAT is 10 to 15 business days

Q: Do the genomic analysis show a better fit for disease analysis compared to nutrient use efficiency?

We have had good success with both NUE as well as disease risk analysis

Q: Also regarding indigeneity/prevalence reporting, where does your geography metadata come from? Is it public or internal?

This is internal. We have a profiled over 35,000 soils from the US agricultural landscape covering over 40 states. We use this database for prevalence reporting. We further have all the soils in our soil freezer farms as well. This allows us to do deeper sequencing if we need to for future analysis as well.

Q: shotgun metagenome are costly compared to amplicon sequencing. And the issue with shotgun is high number of host reads. How is trace genomics working to reduce the cost of shotgun metagenomics by decreasing the host amplification and decreasing the cost at the same time?

We do not work with host tissues. We work with soil microbiome. There is usually some plant tissue, but it is not a big issue. Our pipeline eliminates these sequences.

Q: how much data do you usually generate (ex. sequencing depth) to obtain reliable results?

This varies from soil to soil. It all depends on the soil biomass. In our production system we do shallow metagenome sequencing and have been able to achieve predictable response in the fields. When required we also do deeper sequencing.

Q: What do you see in your data about differences in AMF abundance across different corn growing fields?

We have this data in our database but we haven't looked for trends yet

Q: How field sampling is going to impact the analysis results?

Data is only as good at the inputs are. Trace assists in field sampling protocols. WE work with the customer to understand their needs and work accordingly.

Q: What about the bioinformatics analysis used?

We have an internal bioinformatics pipeline that has been developed.

Q: Bamboo biochar used how much important for agriculture or Horticulture soil ?

I haven’t worked with bamboo biochar