Addressing the rapid emergence of Cassava Witches Broom Disease in Southeast Asia (CROP-2023-157)

June 2022- June 2024

Jonathan Newby, Warren Arinaitwe, Wilmer Cuellar

CROP-2022-110 Inception Meeting

6 September 2023

Sunrise Hotel, Tay Ninh

Project aim: To decipher the biology of cassava witches broom disease and examine whether its causal pathogen has speciated over time, across farming systems and host ranges as a means to design resilient disease management strategies.

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Project objectives

- Sharing knowledge on VSD and CWBD within the research community and developing plans based on the rapidly evolving evidence and findings. The partners and geographical scope of the objective are broader than CROP/2022/110.

- Development of protocols and tools for characterization and detection of CWBD

- Developing new partnerships and prioritising geographical areas for activities based on risk assessment.

- Informing decisions on high-probability interventions to manage CWBD within an IPM framework.

- Communicating the findings to stakeholders within Southeast Asia and beyond.

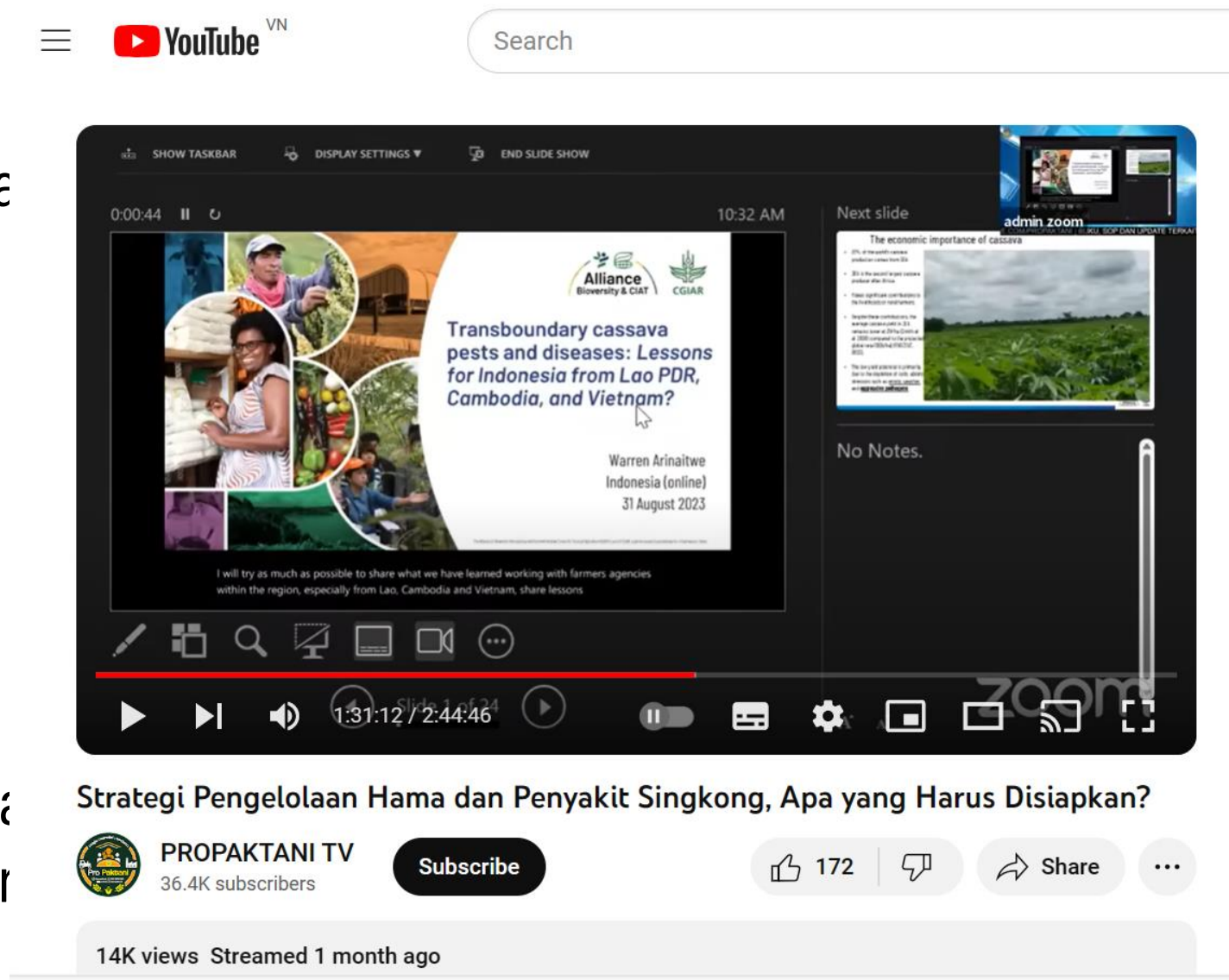
Progress made to date

1. New partnerships

4-5 July 2023: Scoping trip to Indonesia Five CIAT scientists visited BRIN and Indonesia Cacao and Coffee Research Institute

29-30 August 2023 The Department of Science and Technology, DOST Philipines

31 August 2023 [Webinar]Transbounda cassava pests and diseases: Lessons for Indonesia from Lao PDR, Cambodia, and Vietnam?



https://www.youtube.com/live/BtOD3A3UzGI?si=ZzBSDIsvjzMApbVm

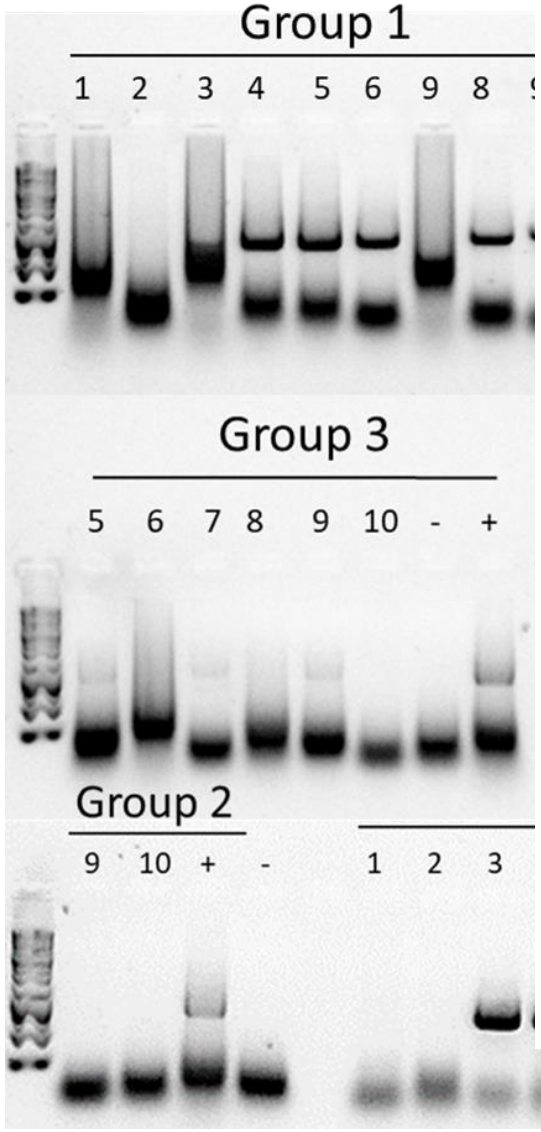
- **376** stakeholders tuned in
- **14k** U-tube views in a month

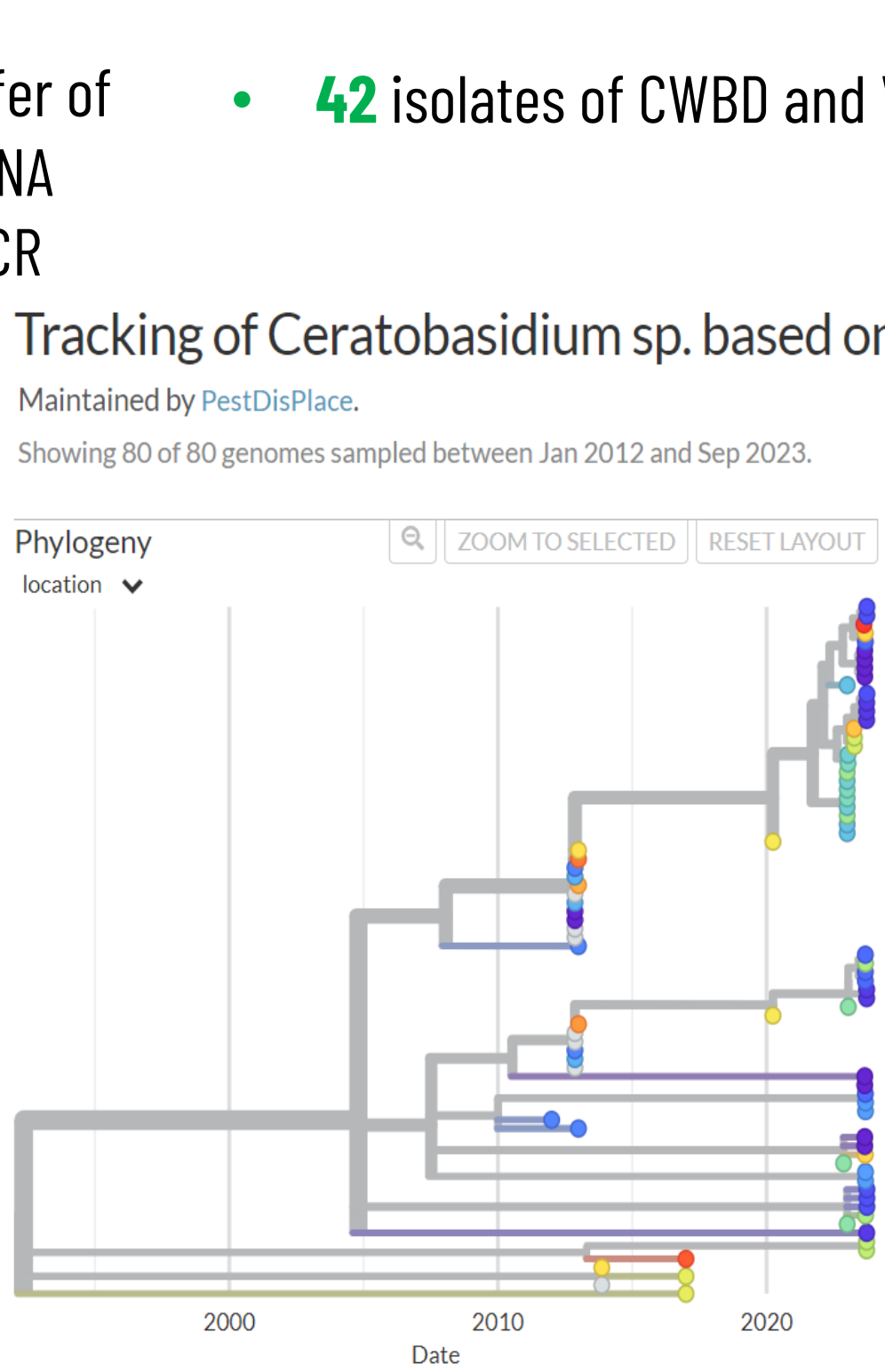
Knowledge sharing workshop on CWBD and cacao Vascular streak Disease- 25-28 Sept 2023

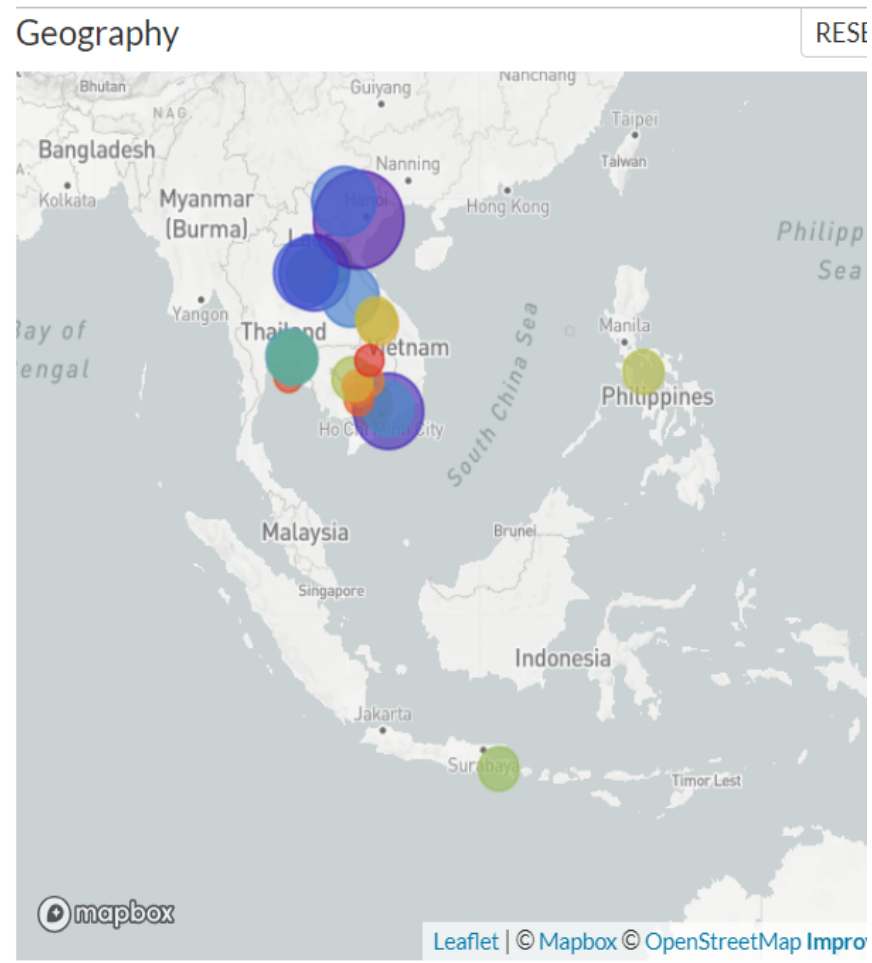
- **25** participants and experts from Cambodia, Vietnam, Thailand, Philippines, Indonesia, Lao PDR, China, Australia, Germany and Colombia
- **15** presentations on CWBD and VSD
- **42** disease samples extracted and analyzed
- Tools and protocols shared

Workshop outputs

- Successful transfer of CWBD AND VSD DNA extraction and PCR methodology
- **42** isolates of CWBD and VSD sequenced on-site

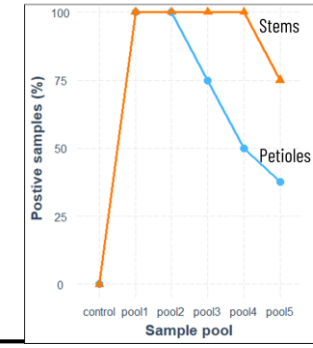






CWBD detection protocol in action

- Supporting decisions in the multiplication of disease-free plantlets in the tunnel system



Pool	Description
Control	Healthy
Pool1	1diseased plant in **5** healthy plants
Pool2	1 diseased plant in **10** healthy plants
Pool3	1 diseased plant in **20** healthy plants
Pool4	1 diseased plant in **40** healthy plants
pool5	1 diseased plant in **60** healthy plants

Re: Lab report for mother plants

AW

Arinaitwe, Warren (Alliance Bioversity-CIAT)

To Thao, Lao (Alliance Bioversity-CIAT)

Cc Malik, Al Imran (Alliance Bioversity-CIAT); Newby, Jonathan (A

Tunnel planting materials 2023.pptx
870 KB

Results for the tunnel mother plants.

Gel ID (see attached)	Variety	Stake ID in the pool (refer to fiel
1	Rayong 11	1-10
2	Rayong 11	11-20
3	Rayong 11	21-30
4	Rayong 11	31-40
5	Rayong 72	1-10
6	Rayong 72	11-20
7	Rayong 72	21-30
8	Rayong 72	31-40
9	KU50	1-20
10	KU50	21-40
11	CM..	1-20
12	CM..	21-40

Hanoi 5 & 2 CWBD free

AW

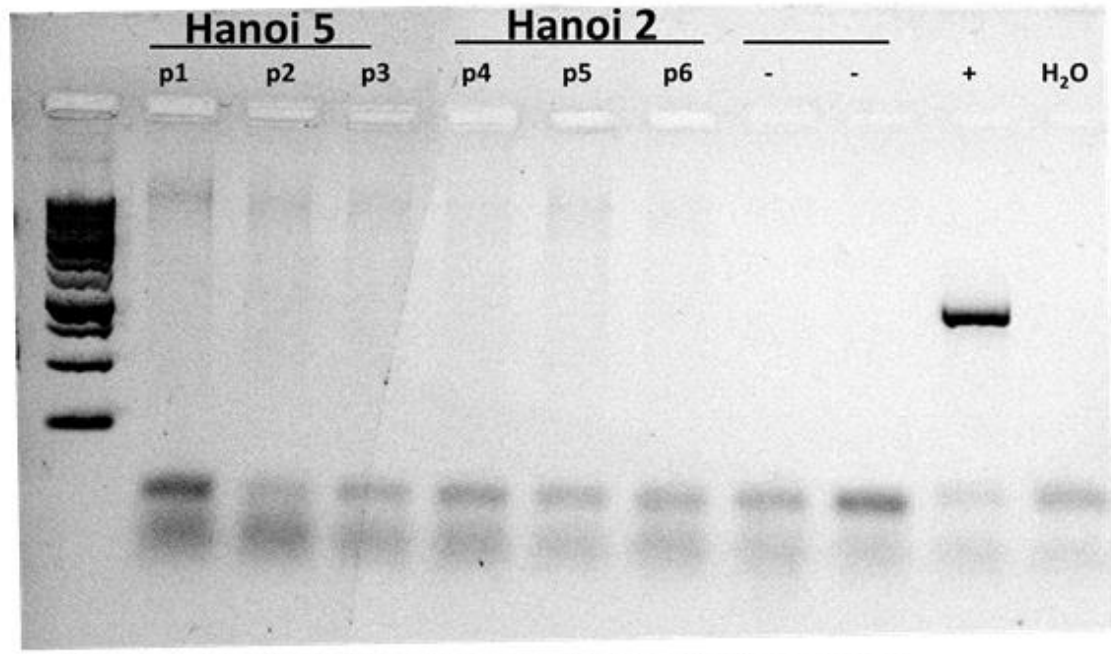
Arinaitwe, Warren (Alliance Biov

To Thao, Lao (Alliance Bioversity-CIAT)

Cc Malik, Al Imran (Alliance Bioversity-CIAT);
Newby, Jonathan (Alliance Bioversity-CIAT); **+1 other**

Dear Laothao,

Proceed with propagation.



p1-p6 represent different pools of 10 stems. Negatives is DNA from healthy cassava stems

- UQ is working on a rapid test assay

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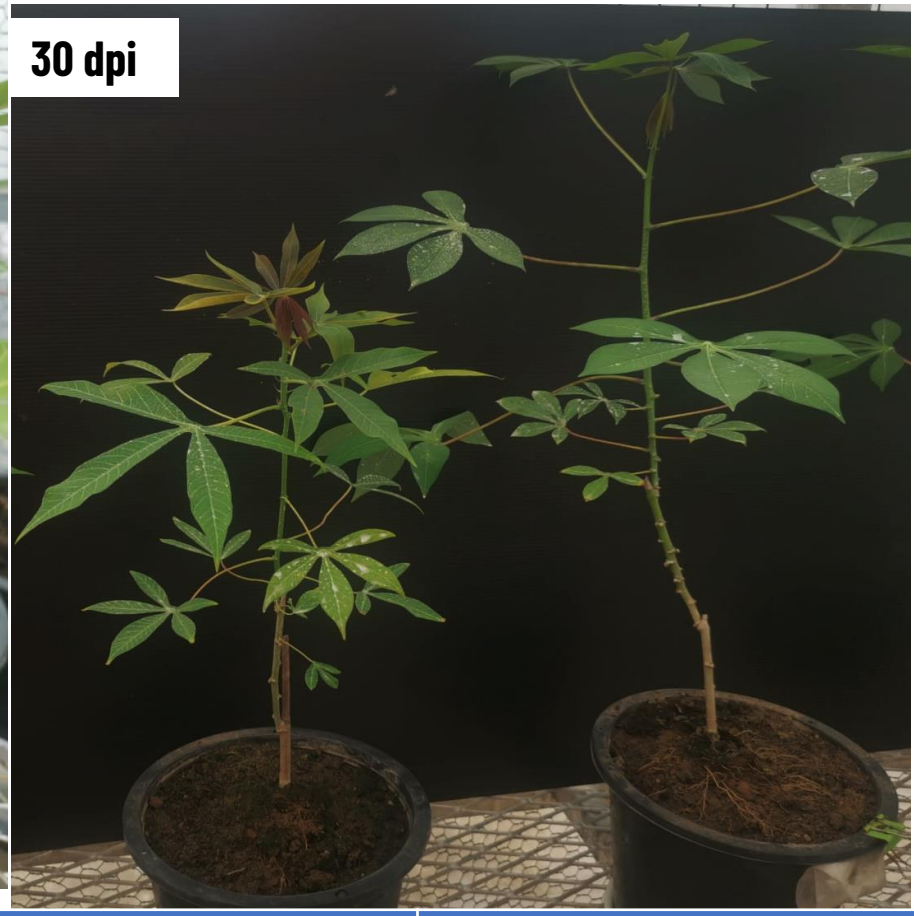
The improved CWBD inoculation based on Keane et al., 1971 yields better infection rates and enhances infectivity and symptom development



Av. Temp (°C)	RH (%)	Av. Prec (mm)	Wind speed (m/s)
27	95	16	0.23

- Average infection rate @30 dpi for Variety A (70%) and Variety B (80%)

Preliminary transmission results indicate *Ceratobasidium* spp as a possible causal organism.

Ongoing and planned studies/activities

- Evaluation of over 80 CWBD core collections against CWBD (we have started screening 25 lines in the screen house
- Collection and analysis of alternate hosts
- Purposive field scanning across farming systems and countries incl. Indonesia, the Philippines and Thailand
- Continue supporting the current seed system with testing before multiplication
- Transcriptomics to identify CWBD-induced genes (ongoing, started in July)
- Risk mapping
- Development of rapid diagnostic assays (LFD, LAMP, droid)

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Thanks!