









Establishing sustainable solutions to cassava diseases in mainland Southeast Asia

Results of Multiplication in Tunnels (2020-2023)

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I. Tunnel location







Overview of tunnels location

Planting material for multiplication





Receiving virus free mother planting materials from NAFRI (Laos)

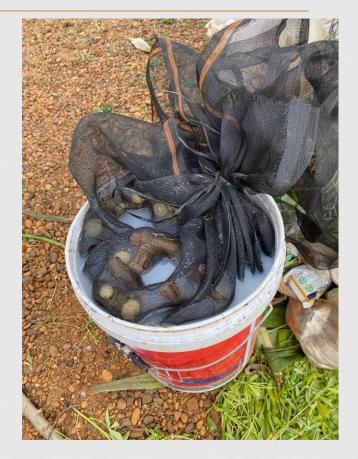
- Oct 2021 (KU50) (GDA & CARDI)
- Jan 2022 (KU50) (GDA & ST)
- May 2022 (KU50)
- Sept 2022 (R72 &KU50) (GDA, ST & BMC)

Taking from multiplication field

Preparation for multiplication



Bed preparation

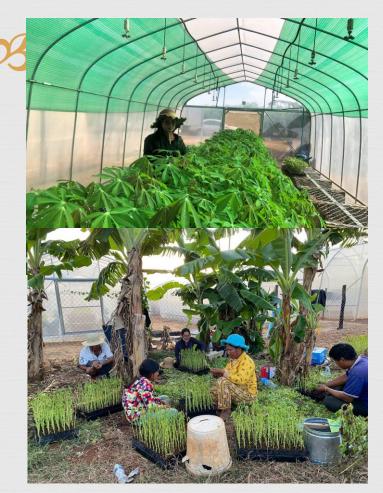


Treatment with fungicide

Activity in Tunnels



Planting in beds and germination



Taking care and cutting plantlets

Plantlets produce from Tunnels

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	1 st Batch (Oct 21)		2nd Batch (Jan 22)		3rd Batch (Nov 22)		4th Bath	(Jun 23)	Total		
				Plantlets planted						Plantlets planted	
Tunnel 1	96	0	3730	1992	1033	56	238	196	5097	2244	
Tunnel 2	96	0	2359	1281	1392	. 57	528	376	4375	1714	
Tunnel 3	96	0	2590	1192	1730	526	480	460	4896	2178	
Tunnel 4	96	0	2782	. 1194	920	697	325	238	4123	2129	
Total	384	. 0	11461	5659	5075	1336	1571	1270	18491	8265	

days cutting and planting of plantlets



	1st Batch (29 Oct 21)			2nd	Batch	(17 Ja:	n 22)	3rd Batch (19 Nov 22)			4th Batch (13 Jun 23)					
	T1	T2	Т3	T4	T1	Т2	Т3	T4	T1	Т2	Т3	T4	T1	T2	Т3	T4
1st cut	79d	79d	79d	79d	79d	79d	79d	79d	55d	55d	55d	87d	74	74	74	74
Planted Planted					90d	90d	90d	90d	48d	48d	48d	37d	30	30	30	30
2nd cut					70d	70d	85d	85d	77d	77d	77d	78d				
Planted Planted					34d	35d	20d	20d			148d	28d				
3rd cut					57d	57d	77d	77d	74d	74d	74d	91d				
Planted Planted					36d	36d	35d	35d								
4th cut					98d	98d										
planted planted					54d	54d										

Economic Analyses

No.	Desription	Unit	Unit price (\$)	Total price (\$)			
I	Two nodes planting on bed			80			
1	Two nodes cutting cost	4	10	40			
2	Labor cost of planting 2 nodes	4	10	40			
II	1st Cutting plantlets (4 tunnels)			210			
3	Coconut ball (1box=1000 ball)	3	50	150			
4	Labor cost of 1st cutting plantlets (2688)	6	10	60			
Ш	2nd Cutting plantlets (4 tunnes)			400			
5	Tray cost (1tray = 96 hole)	40	3	120			
6	Coconut ball (1box=1000 ball)	4	50	200			
7	Labor cost of 1st cutting plantlets (3072)	8	10	80			
IV	3rd cutting plantlets (4 tunnesl)			237			
8	Tray cost (1tray = 96 hole)	24	3	72			
9	Coconut ball (1box=1000 ball)	2.5	50	125			
10	Labor cost of 1st cutting plantlets (2304)	4	10	40			
V	4th Cutting plantlets (4 tunnels)			200			
11	Tray cost (1tray = 96 hole)	20	3	60			
12	Coconut ball (1box=1000 ball)	2	50	100			
13	Labor cost of 1st cutting plantlets (1920)	4	10	40			
VI	Tunnel activity management			1800			
14	Electricity	10	30	300			
15	Taking care tunnel activities	10	150	1500			
	Total cost (I+II+III+IV+V+VI)						

Challenges



- Low germination rate
- Ground water quality (sand or lime block sprinklers)
- Watering in tunnel need to manage properly
- High temperature inside tunnel (more than 45 °C)
- Low survival rate in seed trays
- Termites destroy plantlets in field
- Too much rain in rainy seasons
- Dry season need irrigation
- When temperature is high, population of mealy bug and red spider increase rapidly

Lesson Learns



- Irrigation duration and times can affect mother stake germination rate and quality of plantlets
- Hand mix substrate without paper cover in trays can affect the survival rate of plantlets in field if they were not carefully took out from trays
- Keeping plantlets on bed too long leads to low survival rate
- Keeping plantlets too long in trays cause plantlets weak and high dying rate in open field

Thank You!

