ESTABLISHING SUSTAINABLE SOLUTIONS TO CASSAVA DISEASES IN MAINLAND SOUTHEAST ASIA

AGRICULTURAL GENETICS INSTITUTE
END OF PROJECT

10/2023

Project Objective

- **Objective 1**: Assess the opportunities, challenges and risks for the development of sustainable regional solutions for cassava disease management in mainland SEA including coordinated policy development, sustainable business and public-private funding models;
- **Objective 2**: Enhance the capacity and collaboration between breeding programs in mainland Southeast Asia to develop new product profiles for commercially viable cassava varieties by identifying and incorporating known and novel sources of resistance to Cassava Mosaic Disease (CMD) and Cassava Witches Broom Disease (CWBD) into national breeding programs:
- **Objective 4**: Develop and evaluate technically feasible and economically sustainable cassava seed system models for the rapid dissemination of new varieties and clean planting material to smallholder farmers in different production systems and value chains.

MULTIPLICATION OF CMD RESISTANT VARIETIES

After finished evaluation in late 2019, we determined 42 clones that can resistance to CMD.

We focus only to multiply the CMD resistance clones using tissue culture and traditional method.

Figure 1. Multiplication of 42 resistance clones using tissue culture in AGI

Figure 2. Multiplication of 42 resistance clones in Sonla province

Figure 3. Mother plant in HungYen

MULTIPLICATION OF POTENTIAL CMD RESISTANT CLONES AND DISTRIBUTION TO NARES AND INTERNATIONAL PARTNERS (2020-2021)

No.	Countries	Time	Varieties	Number of plants
1	Laos	08/2020	TMEB419	100
			IITA-TMS-IBA920057	100
			IITA-TMS-IBA972205	100
			IITA-TMS-IBA980505	100
			IITA-TMS-IBA980581	100
		12/2021	TMEB419	100
2	Cambodia	08/2020	TMEB419	100
			IITA-TMS-IBA920057	100
			IITA-TMS-IBA972205	100
			IITA-TMS-IBA980505	100
			IITA-TMS-IBA980581	100
		11/2021	TMEB419	100
			IITA-TMS-IBA972205	100
			IITA-TMS-IBA980581	100
	Total			1400

Figure 4. Package of 500 plants

To national partners (HLARC) in 8/2020: 43 resistance clones

MULTIPLICATION OF POTENTIAL CMD RESISTANT CLONES AND DISTRIBUTION TO NARES AND INTERNATIONAL PARTNERS (2022)

No.	Countries	Time	Varieties	Number of plants
1	Sri Lanka	05/2022	CR24-16 (C36) CR13-8 (C74) AR35-1 (C42) CR27-20 (C80) AR9-48 (C97) CR52A-4 (C83)	10 10 10 10 10 10
	Total			60

TUNNEL SYSTEM

- Test Rapid multiplication by tunnel system in the North of Vietnam in 3 months after planting without fertilizer.

	Number of mother stem	Length of mother stem	Number of 3 nodes cuttings	The space between nodes	First time	**Second time**	**Third time**	Total cuttings	**Survival cuttings**	**Rooting rate**	Multiplication rate
AR9-48	**10**	1.1 m	69	15 cm	45	26	50	**121**	109	90	10.9
TMEB419	**10**	1.5 m	110	10 cm	45	187	216	**448**	403	90	40.3
CR24-16	**10**	1.5 m	154	7 cm	45	238	353	**636**	572	89	57.2
Total	**30**		**323**					**1205**	**1084**		**36.3**

TEST RAPID MULTIPLICATION BY TUNNEL SYSTEM IN THE NORTH OF VIETNAM

- Adaption and testing tunnel system for propagation in AGI

Figure 5. Tunnel system. From left to right: After planting 1 week, after planting 4 weeks, after plating 5 weeks and experiment to cut after 5 weeks

TEST RAPID MULTIPLICATION BY TUNNEL SYSTEM IN THE NORTH OF VIETNAM

- Adaption and testing tunnel system for propagation in AGI

Figure 6. Cutting from tunnel system. From left to right: in white and blue tray, 4 weeks after multiplied, black tray is plants cutting from 5 weeks-mother plant

MULTIPLICATION OF POTENTIAL CMD RESISTANT CLONES AND DISTRIBUTION TO NATIONAL PROVINCES (2020-2023)

No	Agro-ecological zones	*In vitro*	Tunnel	Cutting	Total
I	**Northern mountainous**				
	Yên Bái			10,000	**10,000**
II	**North Central Region**				
	Nghệ An			10,000	**10,000**
	Thanh Hóa	600		10,000	**10,600**
	Quảng Trị			10,000	**10,000**
III	**South Central Coast**				
	Quảng Ngãi	2,000		200,000	**202,000**
	Phú Yên	300			**300**
IV	**Central Highland**				
	Daklak			1,000	**1,000**
	Kontum			20,000	**20,000**
V	**Southeast region**				
	Tây Ninh			30,000	**30,000**
	Total	**2,900**	**-**	**291,000**	**293,900**

No	Agro-ecological zones	IBA980581	IBA972205	TMEB419	CR24-16	CR27-20	AR9-48	Total
I	**Southeast region**							
1	Tây Ninh	300		100	2	6	2	**410**
2	Đồng Nai	200		700				**900**
3	Bình Phước	200		10				**210**
4	Bà Rịa Vũng Tàu	30		10				**40**
II	**Northern mountainous**							
1	Yên Bái	5	5					**10**
III	**North Central Region**							
1	Nghệ An	2						**2**
2	Thanh Hóa	10						**10**
3	Quảng Trị	3						**3**
4	Huế	5						**5**
IV	**South Central Coast**							
1	Quảng Ngãi	40	5					**45**
2	Quảng Nam		1					**1**
3	Phú Yên	20						**20**
4	Bình Định	1						**1**
5	Ninh Thuận	10						**10**
6	Bình Thuận	50		40				**90**
7	Khánh Hòa	1						**1**
V	**Central Highland**							
1	Kon Tum	100		20				**120**
2	Đak lak	150						**150**
3	Gia Lai	200						**200**
4	Đak Nông	40						**40**
VI	**Southwest region**							
1	An giang	5		5				**10**
	Total	**1372**	**11**	**885**	**2**	**6**	**2**	**2278**

Figure 7. IBA972205 & IBA980581 in Sathay, Kontum (Central Highland)

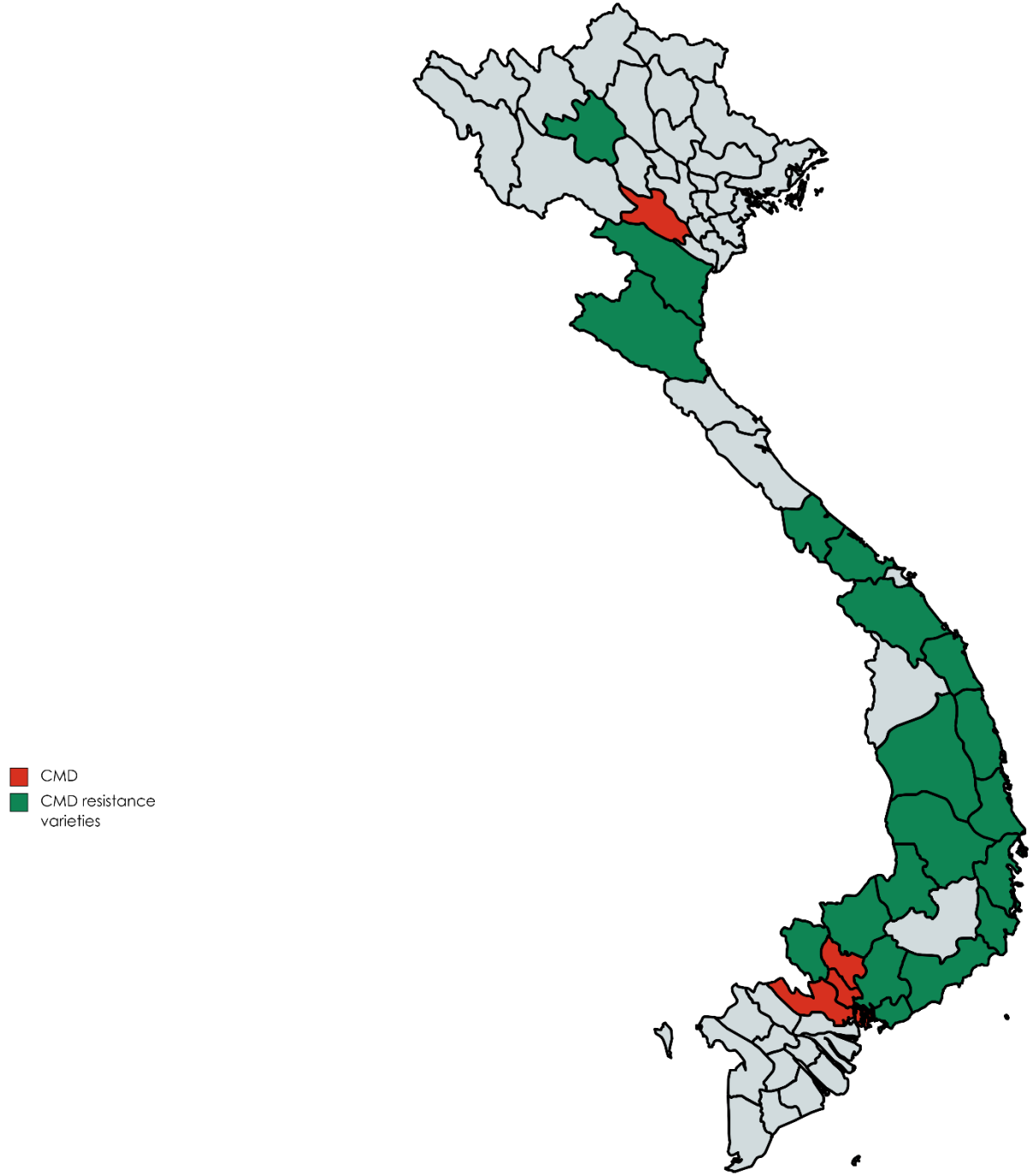
Figure 8. IBA972205 & IBA980581 in SonTinh, Quangngai (South Central Coast)

Figure 9. IBA972205 & IBA980581 in SuoiDay, Tayninh (Southern Central Region)

Figure 10. IBA980581 in Gialai (Central Highland)

Figure 11. TMEB419 in Tayninh (Southeast region)

Figure 12. IBA972205 in Tayninh (Southeast region)


CMD
CMD resistance varieties

THANK YOU FOR LISTENING