Update of CMD resistant screening in Vietnam

PROJECT

Establishing sustainable solutions to cassava diseases in mainland Southeast Asia

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National Key Laboratory for Plant Cell Biotechnology

Agricultural Genetics Institute

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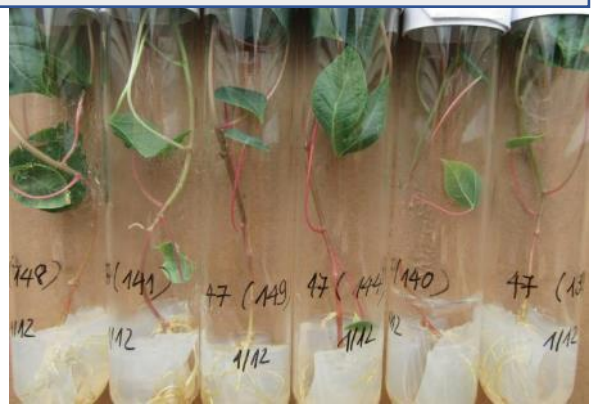
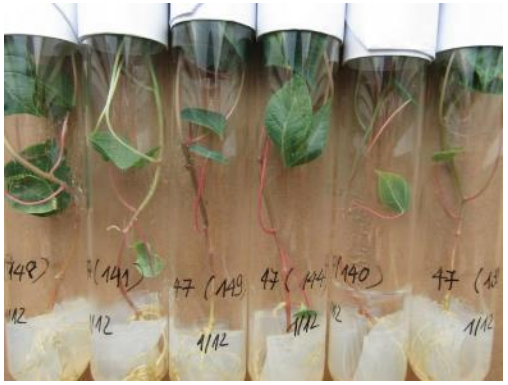


Activities

1. Imported cassava accessions/varieties
2. Propagation and providing imported accession/varieties to partners
3. Screening of CMD resistance and yield performance
4. Breeding for new CMD resistance varieties



Imported materials from CIAT and IITA

- 102 clones from CIAT (CMD Resistant parent)
- 5 varieties from IITA (CMD resistant)
- >475 seeds from CIAT (CMD resistant)

Propagation of materials

- 102 clones from CIAT (CMD Resistant parent, 2019)

  > 200 plants/clones for field test and distribution to partners

- 5 varieties from IITA (CMD resistant, 2018)

  - > 1000 plants/clones for field test and distribution to partners

- >400 seeds from CIAT (CMD resistant, 2020)

  - germinated and will be propagated for field test

In vitro propagated plants

In vitro plants 2 months after transplanting to soil pots

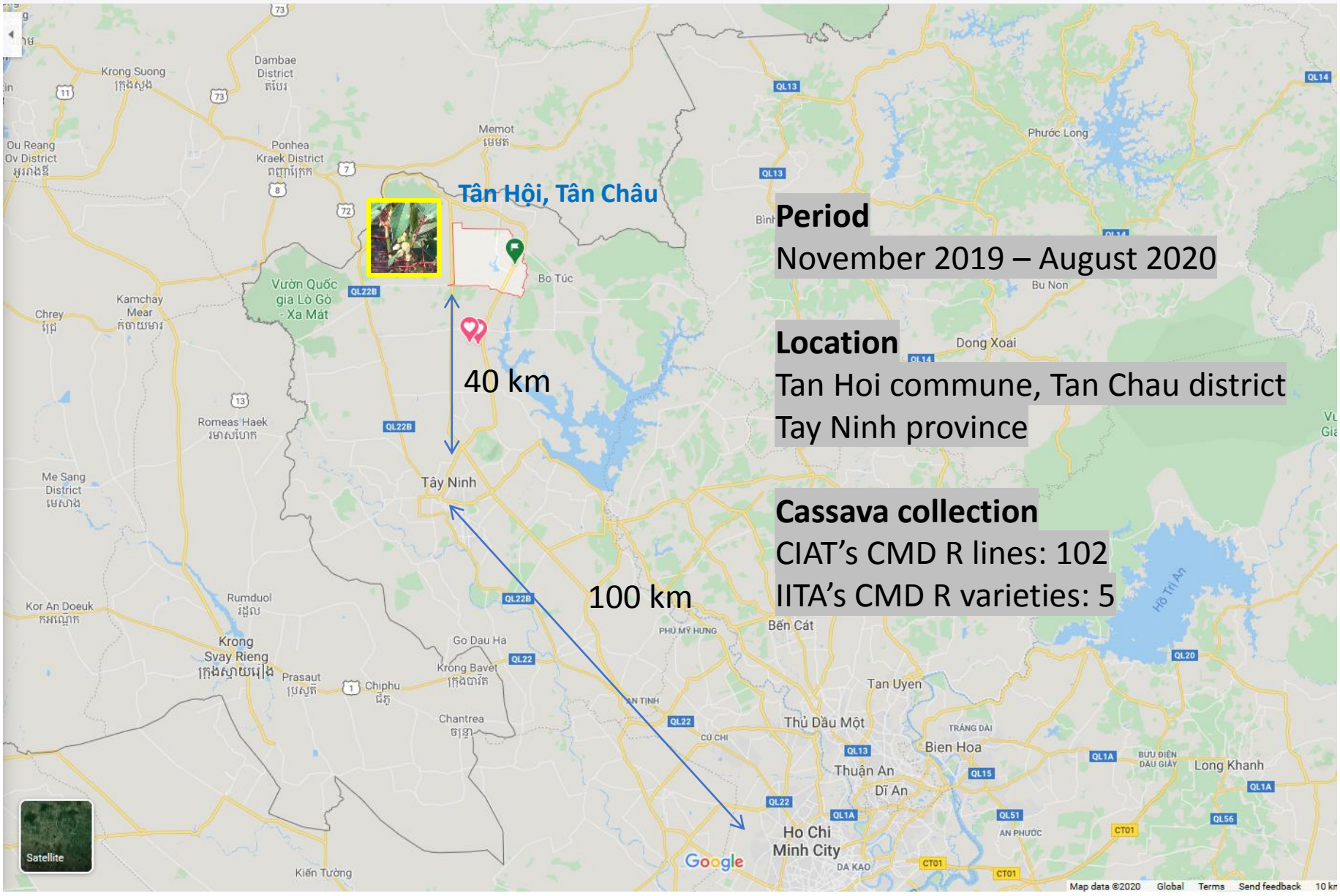
In vitro propagated plants

Screening for CMD resistance

- 102 clones from CIAT (CMD Resistant parent, 2019)
- 5 varieties from IITA (CMD resistant, 2018)

  - 1st field test: October 2019
  - 2nd field test: May 2020

Screening for CMD resistance



Period

November 2019 – August 2020

Location

Tan Hoi commune, Tan Chau district

Tay Ninh province

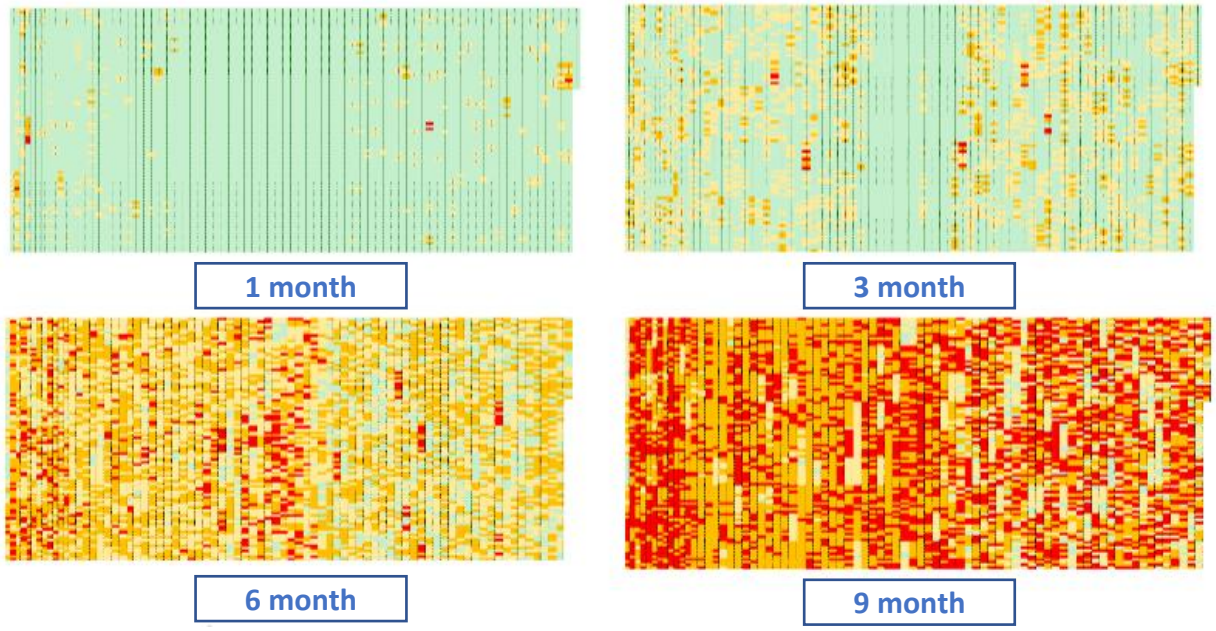
Cassava collection

CIAT's CMD R lines: 102

IITA's CMD R varieties: 5

Field test

1. Each clone: 3 plots of 4 x 9 plants + 1 CMD spreader row
2. 12 columns of plots (each plot = 4 rows)
3. Total area of ~ 1 ha



CMD development in field of mostly susceptible varieties

Field test

- From CIAT: 48/102 CMD Resistant clones
- From IITA: 5/5 CMD Resistant varieties
  - Yield: 27-30 tons/ha
  - Starch content: 24-27%

HN1 / TMEB419 (CMD-R) 5 months old

KM419 (CMD-S)

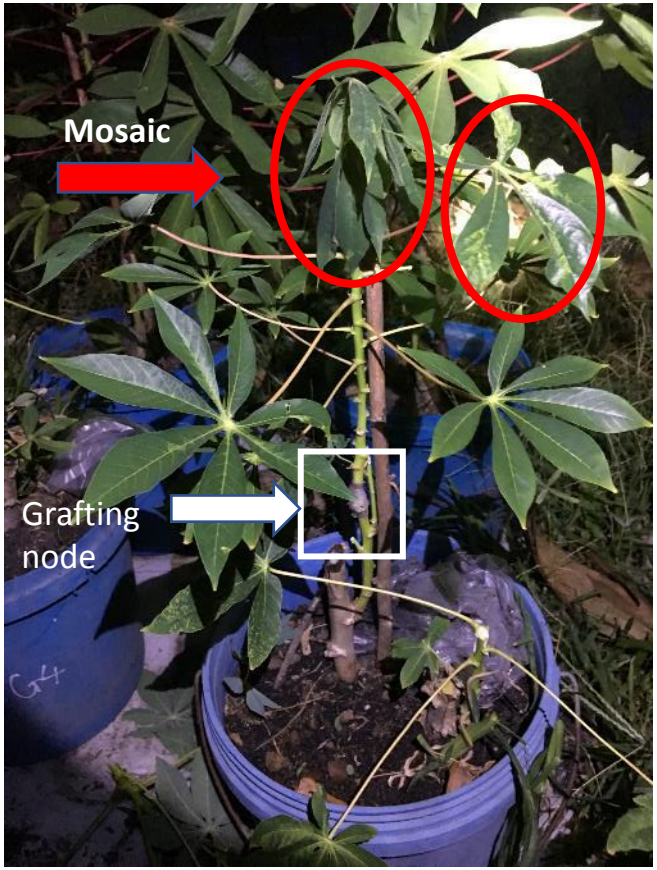
HN2 / IITA-TMS-IBA980581 (CMD-R)

HN3 / IITA-TMS-IBA980505
CMD-R
5 months old

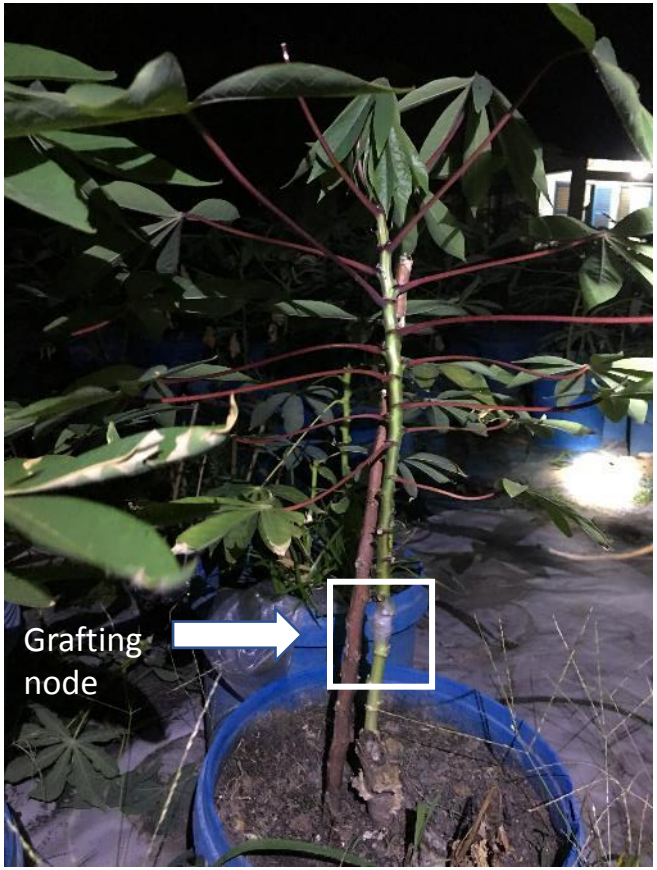
HN5 / IITA-TMS-IBA920057 (CMR-R) 5 months old

Confirmation of CMD resistance by grafting

Confirmation of over 40 CMD-R clones



CMD susceptible



CMD Resistant

Development of new grafting method

- On field
- Simple
- Efficient
- Producing results within 6-8 months after receiving in vitro plants
- Test up to 1000 lines at a time

IITA's CMD-resistant varieties on the field

CMD-R 1 month after planting

CMD-S 1 month after planting

IITA resistant varieties on the field in Tay Ninh province

CMD-R 1 month after planting

CMD-S 1 month after planting

Germination of botanical seeds






Entry	Familly (Temporary name)	Code	Family	Mother	Father	Seeds	Pourp. 1	Pourp. 2	Source	Received seed	Germination after 2 weeks	Germination rate (%)	Transplant (plants)
1	CR 1	VN01	CM 6153	COL1505	VEN25	12	Z01	Z01	GY201809	11	5	45.45	5
2	CR 2	VN02	GM 8870	GM579-13	SM3134-5	14	MSC	MSC	GY201809	13	12	92.31	12
3	CR 3	VN03	GM 9611	C33	SM2828-28	12	CMD	MSC	GY201904	11	11	100.00	11
4	CR 3	VN04	GM 9612	C243	SM2828-28	12	CMD	MSC	GY201904	11	11	100.00	11
5	CR 4	VN05	GM 9612	C243	SM2828-28	10	CMD	MSC	GY201904	9	6	66.67	6
6	CR 4	VN06	GM13170	COL1722	CR138	11	CC+	CC+	GY201809	10	8	80.00	8
7	CR 5	VN07	GM13191	CR138	MAL3	14	CC+	CC+	GY201808	13	7	53.85	8
8	CR 5	VN08	GM13195	CR138	PER183	10	CC+	CC-	GY201809	9	9	100.00	9
9	CR 6	VN09	GM13217	MAL3	VEN25	12	CC+	CC-	GY201812	11	7	63.64	7
10	CR 7	VN10	GM13217	MAL3	VEN25	14	CC+	CC-	GY201809	13	13	100.00	13
11	CR 7	VN11	GM13358	COL1505	COL1722	14	CC+	CC+	GY201812	13	10	76.92	10
12	CR 8	VN12	GM20001	C19	HB60	12	CMD	Z01	GY201904	11	10	90.91	10
13	CR 9	VN13	GM20002	C33	HB60	12	CMD	Z01	GY201904	11	9	81.82	9
14	CR 9	VN14	GM20003	C413	HB60	12	CMD	Z01	GY201904	11	11	100.00	11
15	CR 10	VN15	GM20005	COL1505	C243	14	Z01	CMD	GY201904	13	8	61.54	8
16	CR 11	VN16	GM20006	COL1505	GM7673-3	14	Z01	CMB	GY201904	13	11	84.62	11
17	CR 12	VN17	GM20008	CR138	GM10055B-1	14	CC+	CMB	GY201904	14	11	78.57	11
18	CR 13	VN18	GM20009	GM10054B-2	HB60	12	CMB	Z01	GY201904	12	9	75.00	9
19	CR 14	VN19	GM20016	GM6125-13	SM2828-28	8	CMB	MSC	GY201904	8	6	75.00	6
20	CR 14	VN20	GM20017	GM7671-2	SM3137-40	12	CMB	MSC	GY201904	12	10	83.33	10
21	CR 15	VN21	GM20018	GM7672-5	SM2828-28	12	CMB	MSC	GY201904	12	8	66.67	8
22	CR 15	VN22	GM20019	GM7672-7	SM2828-28	12	CMB	Z01	GY201904	12	9	75.00	9
23	CR 16	VN23	GM20020A	GM7673-3	HB60	12	CMB	Z01	GY201904	12	9	75.00	10
24	CR 16	VN24	GM20020B	HB60	GM7673-3	12	Z01	CMB	GY201904	12	9	75.00	9
25	CR 17	VN25	GM20023	GM8868-85	C33	12	MSC	CMD	GY201904	12	10	83.33	9

Entry	Familly (Temporary name)	Code	Family	Mother	Father	Seeds	Pourp. 1	Pourp. 2	Source	Received seed	Germination after 2 weeks	Germination rate (%)	Transplant (plants)
26	CR 18	VN26	GM20027	HB60	GM10054B-1	12	Z01	CMB	GY201904	12	9	75.00	9
27	CR 19	VN27	GM20028	SGB765-4	GM7671-5	10	Z01	CMB	GY201904	10	10	100.00	10
28	CR 20	VN28	GM20030	SM2828-28	C39	12	MSC	CMD	GY201904	12	4	33.33	4
29	CR 21	VN29	GM20031	SM2828-28	GM10055B-1	12	MSC	CMB	GY201904	12	6	50.00	6
30	CR 22	VN30	GM20032	SM2828-28	GM7673-3	10	MSC	CMB	GY201904	10	6	60.00	4
31	CR 23	VN31	GM20033	SM3110-15	C243	12	MSC	CMD	GY201904	12	10	83.33	10
32	CR 23	VN32	GM20035	SM3134-5	C19	12	MSC	CMD	GY201904	12	4	33.33	6
33	CR 24	VN33	GM20035	SM3134-5	C19	10	MSC	CMD	GY201904	10	9	90.00	9
34	CR 24	VN34	GM20036	SM3134-5	C243	12	MSC	CMD	GY201904	12	2	16.67	3
35	CR 25	VN35	GM20037	SM3134-5	GM10054B-1	12	MSC	CMB	GY201904	12	2	16.67	3
36	CR 25	VN36	GM20038	SM3134-5	GM10054B-2	12	MSC	CMB	GY201904	12	3	25.00	3
37	CR 26	VN37	GM20039	SM3134-5	GM10055B-1	12	MSC	CMB	GY201904	11	1	9.09	1
38	CR 27	VN38	GM20039	SM3134-5	GM10055B-1	10	MSC	CMB	GY201904	9	0	0.00	0
39	CR 28	VN39	GM20040	SM3134-5	GM7673-3	12	MSC	CMB	GY201904	11	1	9.09	2
40	CR 29	VN40	GM20042	SM3150-17	C19	12	MSC	CMD	GY201904	11	4	36.36	4
41	CR 30	VN41	GM20043	SM3150-17	C33	8	MSC	CMD	GY201904	7	1	14.29	1
42	CR 31	VN42	GM12018	GM9009-5	C18	12	CMD	YRT	GY201806	11	5	45.45	4
					Total	**497**				**475**	**306**	**63.86%**	**309**

#19 – (C-39)

- CMD tolerant: CMD score - 2
- high yielding: 70 – 100 ton/ha
- Branching
- Low starch content: 20 – 22%
- Flowering profusely
- Good candidate parent

International Laboratory for Cassava Molecular Breeding

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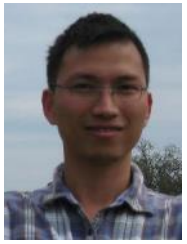
GS. Lê Huy Hàm



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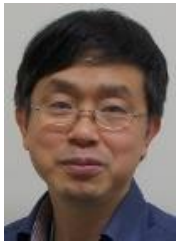

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Thank you for your kind attention