

Agricultural **BIOTECHNOLOGY** Research Institute

Ayub Agricultural Research Institute, Faisalabad.

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No. 2247

Date 6-12-22

To,

The Chief Scientist
Vegetable Research Institute,
AARI, Faisalabad

SUBJECT: **DNA FINGERPRINTING OF TOMATO HYBRIDS FOR VARIETY APPROVAL**

Kindly find enclosed herewith DNA fingerprinting reports of tomato hybrids i.e. Marjan-F1 and Samar-F1 for your information. **It is further stated that as per already circulated guidelines of Chief Scientist AARI, Faisalabad vide letter No. 46274-99/Plan dated 25-11-2021 (attached as Annexure) the name of DNA fingerprinting team of vegetables as described below should be acknowledged in the Proposal for the Approval of varieties under a sub-heading "DNA Fingerprinting Team".**

1. Dr. Sajid Ur Rahman Chief Scientist (ABRI)
2. Ms Shakra Jamil (Botanist Biotechnology)
3. Mr. Rahil Shahzad (Scientific Officer)

Further it is intimated that this data may be not used for publication purpose without prior permission from the concerned scientist. This is for information and further necessary action.

*Mr M. Kashif, Sr.
for n/a.
Email to Coordinator
P.S.C.*

*6/12/22
C.S.*


(DR. SAJID UR RAHMAN)
Chief Scientist
Agri. Biotechnology Res. Inst.
AARI, Faisalabad



No. 2248

Date. 6-12-22

DNA Fingerprinting Report of Tomato

<u>Sample Reference:</u>	Tomato Leaves
<u>Sample receiving date:</u>	22-08-2022
<u>Customer Name:</u>	Chief Scientist (Vegetable)
<u>Customer/ Department:</u>	Vegetable Research Institute Faisalabad
<u>Name of Candidate Line in NUYT:</u>	LTH-324
<u>Name of Candidate Line for Approval:</u>	Marjan F1
<u>Name of Testing Method:</u>	PCR-SSRs
<u>Sample Status:</u>	Leaves
<u>Report dispatch date:</u>	02-12-2022

Sr. No	Name of Marker	Size of DNA fragment/Amplicon (bp)			Candidate variety Marjan-F1
		Standard 1 Salar-F1	Standard 2 Sandal-F1	Standard 3 Sundar-F1	
1.	SSR28	140,160,180	140,160,200,210,230,275,300,500,	140,160,200,210,230,275,300,500,	140, 160, 180
2.	SSR62	-	140,150,290,	140,150,290,	140, 150, 200, 225, 280, 350, 380, 390
3.	SSR555	200,205, 240, 250,255, 280	200,205,215,240,250,255,280	200,205,250,255,280	200, 240, 280, 320
4.	LEATA004	160, 170, 190, 200, 215	160,170,190,200,215	140,160,170,190,200,215,	140, 160, 190, 200, 215
5.	LETTC002	120, 175, 180, 280, 310, 320, 380	120,175,180,280,310,320,380,	120,135,145,175,180,280,310,320,380,	120, 240
6.	MI23	120, 300	120,230,245,	120, 300	120, 130, 200, 220
7.	SLR10	110, 125, 135, 145, 180, 190, 240, 275, 300, 330, 400	110, 125, 135, 145, 180, 190, 240, 275, 300, 330, 400	110, 125, 135, 145, 180, 190, 240, 275, 300, 330, 400	110, 125, 180, 275
8.	SLR26	-	-	110, 120, 170	110, 120, 130, 170, 180, 210, 220, 240
9.	SSR09	110, 120, 165, 175, 285, 300	110, 120, 165, 175, 285, 300	110, 120, 165, 175, 285, 300	110, 120, 175, 190, 230, 240, 285, 300
10.	SSR104	150, 180, 250, 300, 310, 320, 340, 390	150, 250, 300, 310, 320, 340, 390	150, 250, 300, 310, 320, 340, 390	250, 300
11.	SSR105	105, 120, 145, 150, 180, 185, 195, 220	105, 120, 145, 150, 180, 185, 195, 220	105, 120, 145, 150, 180, 185, 195, 220	105, 120, 145, 150, 180, 195, 220, 240
12.	SSR139	150, 170, 180, 210	170, 180,	170, 180	170, 180, 200, 210
13.	SSR201	100, 120, 210, 240	100, 120, 210, 240	100, 120, 210, 240	100, 120

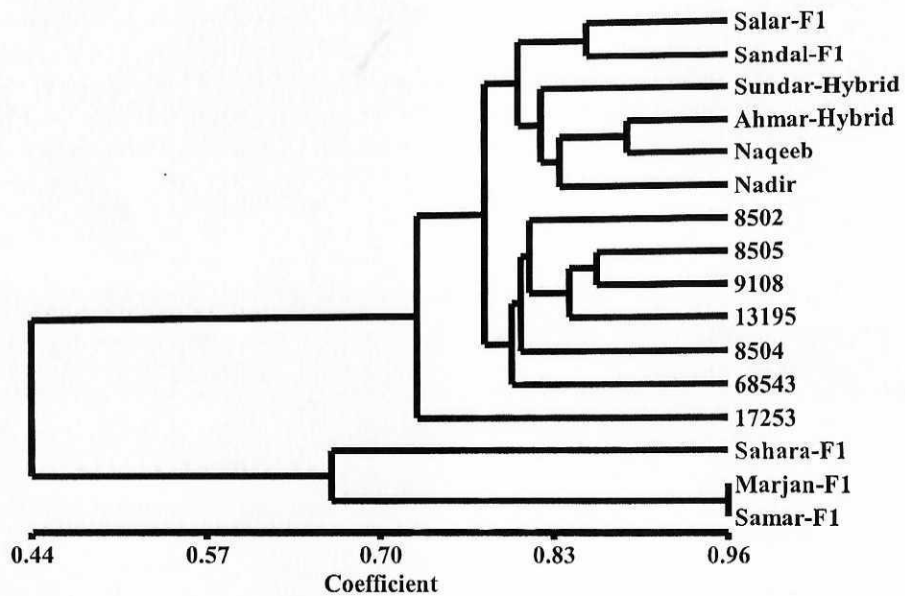
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14.	SSR44	-	-	175, 260,	150, 175, 250, 450
15.	SSR73	260, 270, 290, 350, 380, 390	260, 270, 290, 350, 380, 390	350, 380, 390	380, 390
16.	Z1063	180, 250, 260, 280, 300	180, 235, 250, 260, 300	180, 250, 260, 300	-
17.	AW03145 3	-	-	-	160, 200, 280, 300, 380
18.	AW03734 7	200	155, 200	-	175, 200
19.	TOM59- 60	120, 130, 165, 170, 200, 225	120, 165, 200, 210, 225	120, 130, 165, 200	-
20.	NM11027 8976	120, 145, 175, 225, 250	120, 145, 225, 250	120, 145, 175, 225, 250	110, 115, 145, 175, 250, 265
21.	SLR3	160, 170, 180, 190, 200	115, 160, 180, 200	160, 170, 180, 190, 200	160, 170, 175, 190, 200
22.	SSR128	110, 125, 140, 150, 160	110, 125, 140, 150, 160	110, 125, 140, 150, 160	110, 125, 130, 150, 160, 170
23.	SSR146	180, 190, 210, 225, 330, 398	180, 190, 210, 225, 330, 398	180, 190, 225, 398	125, 225, 245, 250
24.	SSR15	110, 130, 145, 225	110, 130, 145, 225	110, 130, 145, 180, 225	110, 180, 190, 200, 225, 230
25.	SSR134	175, 180, 190, 215, 240, 490, 580	175, 180, 190, 215, 240, 580	-	175, 180, 190, 215
26.	SSR201	100, 120, 210, 240	100, 120, 210, 240	100, 120, 210, 240	100, 120
27.	SSR214	100, 130, 200, 245, 260	230, 245, 260	235, 245, 260	100, 110, 130, 200, 230, 245, 260
28.	SSR192	135, 170, 190, 245, 260, 280, 410	135, 170, 190, 245, 280, 410	110, 135, 170, 190, 235, 245, 260, 280, 410	110, 170, 180, 190
29.	SSR20	110, 130, 180, 195, 205, 250, 320	110, 130, 160, 180, 195, 205, 250, 320	110, 130, 180, 195, 205, 250, 320	110, 160, 170, 180, 195
30.	SSR162	140, 165, 190, 200, 210, 240, 250, 275,	140, 165, 190, 200, 210, 240, 250, 275	140, 165, 190, 200, 210, 240, 250, 275	125, 140, 165, 190, 200, 210, 240, 250, 275
31.	SSR32	175, 190, 200,	175, 190, 200,	175, 190, 200,	175, 180, 190
32.	SSR333	140, 150, 175, 300, 310, 330, 350, 360	140, 300	150, 175, 300, 310, 330, 350, 360	140, 150, 175, 200, 210, 220, 250, 260
33.	SSR344	100, 175, 275, 300, 320, 330,	175, 275, 300, 320, 330,	100 175, 275, 300, 320, 330,	100, 160, 175, 190, 275, 300, 320, 330

34.	SSR345	160, 170, 200, 210,225,	-	160,170,200,210,225,3 00	-
35.	SSR46	120,140,150,165,25 0,280,340,350,370, 400	120,140,150,165,250,28 0,340,350,370,400	120,140,150,165,250,2 80,340,350,370,400	250, 280, 340
36.	SSR450	270,300,370,	260, 270,300,370,	270,300,370,	260, 270, 300, 310
37.	SSR565	140,175,200,260,30 0,370,380,	140,175,200,260,300,37 0,380,	140,175,200,260,300,3 70,380,	370, 380
38.	ssr603	105,210,, 290, 300, 320, 400	105,210,, 290, 300, 320, 400	170,,210,, 290, 300, 320, 400	170, 210, 250, 290, 300
39.	TGO302	210,230,2501,260,3 20,350,370	210,230,2501,260,320,3 50,370	140, 210,230,2501,260,320, 350,370	110, 600
40.	TFSUR1	300,360,380,400	300,360,380,400	300,360,380,400	100, 500
41.	TG479	145,175,200,	200	200	175, 380
42.	TOM160- 161	200,215,250,300	190,200,215,250,300	130,190,200,215,250,3 00,380	200, 215
43.	TOM49- 50	115,165,225,250	115, 165,225,250	-	165
44.	TOM31a- 32a	130,140,175,190,25 0,275,350	130,140, 175,190,250,275,350	130, 175,190,210	130, 175, 190, 200, 210, 230
45.	TOM55- 56	160,170,200,250,26 0,	160,170,200,250,260,23 0	160,170,200,250,260,	160, 170, 180
46.	SSR276	150,160,	150,160,	150,160,	190, 200, 270, 290
47.	U81986	190,220,270	270	190,250	170, 180, 190, 220
48.	XM01032 3394	110, 120, 170, 180, 200, 240	110, 120, 170, 180, 200, 240	110, 120, 170, 180, 200, 240	110, 120, 170, 180, 200, 240
49.	SSR86	200, 210, 220, 230, 270, 290	200, 210, 220, 230, 270, 290	200, 210, 220, 230, 270, 290	200, 210, 220, 230, 270, 290
50.	SSR94	140, 190, 200, 210, 225	140, 190, 200, 210, 225	140, 190, 200, 210, 225	140, 190, 200, 210, 225

Cultivar Identification Diagram (CID)








Results/Remarks

Cultivar Identification Diagram (CID) presenting the association among standard hybrid (Salar-F1, Sandal-F1, and Sundar-F1) and candidate hybrid (Marjan F1) was generated by Unweighted paired group method with arithmetic means (UPGMA). X-axis represents genetic similarity coefficient between genotypes which ranged from 0.44 to 0.96. CID results concluded that candidate hybrid Marjan F1 varied significantly from the standard varieties i.e. Salar-F1, Sandal-F1, and Sundar-F1 showing 42%, 41% and 41% dissimilarity respectively.

However, Samar-F1 and Marjan-F1 which are newly evolved hybrids showed 96% genetic similarity.

	Analyst/Prepared By:	Focal Person/Checked By:	Chief Scientist/ Director
Signature:			
Stamp:			
Name:	Rahil Shahzad	Ms. Shakra Jamil	Dr. Sajid Ur Rahman
Designation	Scientific Officer	Botanist Biotechnology	Chief Scientist



No. 2249
Date 6-12-22

DNA Fingerprinting Report of Tomato

Sample Reference: Tomato Leaves
Sample receiving date: 22-08-2022
Customer Name: Chief Scientist (Vegetable)
Customer/ Department: Vegetable Research Institute,
 Faisalabad
Name of Candidate Line in NUYT: LITTH-904
Name of Candidate Line for Approval: Samar F1
Name of Testing Method: PCR-SSRs
Sample Status: Leaves
Report dispatch date: 02-12-2022

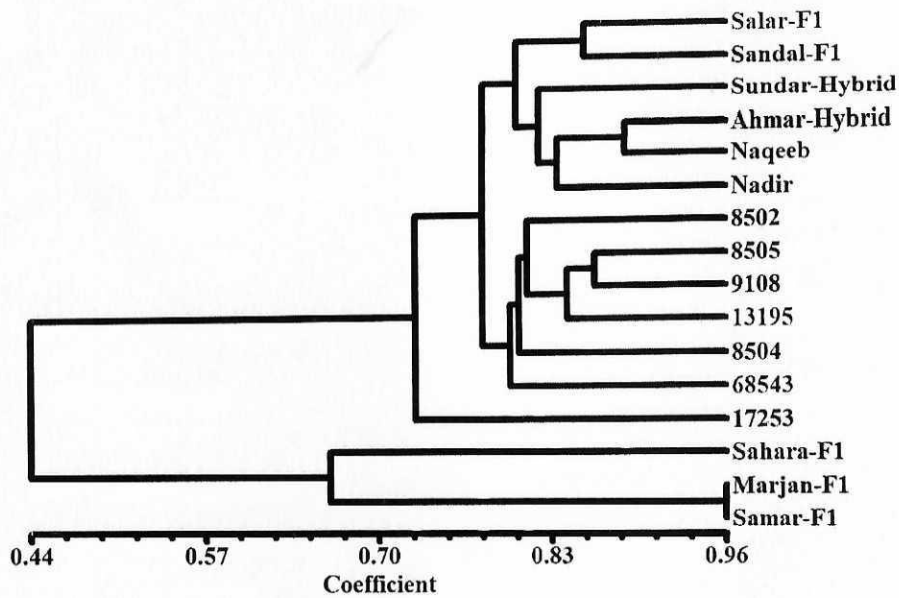
Sr. No	Name of Marker	Size of DNA fragment/Amplicon (bp)			
		Standard 1 Salar-F1	Standard 2 Sandal-F1	Standard 3 Sundae-F1	Candidate variety Samar-F1
1.	SSR28	140,160,180	140,160,200,210,230,275,300,500,	140,160,200,210,230,275,300,500,	140, 160, 180
2.	SSR62	-	140,150,290,	140,150,290,	140, 150, 200, 225, 280, 350, 380, 390
3.	SSR555	200,205, 240, 250,255, 280	200,205,215,240,250,255,280	200,205,250,255,280	200, 215, 240, 320
4.	LEATA004	160, 170, 190, 200, 215	160,170,190,200,215	140,160,170,190,200,215,	140, 160, 190, 200
5.	LETT002	120, 175, 180, 280, 310, 320, 380	120,175,180,280,310,320,380,	120,135,145,175,180,280,310,320,380,	120, 240
6.	MI23	120, 300	120,230,245,	120, 300	120, 130, 200, 220
7.	SLR10	110, 125, 135, 145, 180, 190, 240, 275, 300, 330, 400	110, 125, 135, 145, 180, 190, 240, 275, 300, 330, 400	110, 125, 135, 145, 180, 190, 240, 275, 300, 330, 400	110, 125, 145, 180, 275
8.	SLR26	-	-	110, 120, 170	110, 120, 130, 170, 180, 210, 220, 240
9.	SSR09	110, 120, 165, 175, 285, 300	110, 120, 165, 175, 285, 300	110, 120, 165, 175, 285, 300	110, 120, 175, 190, 230, 240, 285, 300
10.	SSR104	150, 180, 250, 300, 310, 320, 340, 390	150, 250, 300, 310, 320, 340, 390	150, 250, 300, 310, 320, 340, 390	250, 300
11.	SSR105	105, 120, 145, 150, 180, 185,	105, 120, 145, 150, 180, 185, 195, 220	105, 120, 145, 150, 180, 185, 195, 220	105, 120, 145, 150, 180, 195, 220, 240

		195, 220			
12.	SSR139	150, 170, 180, 210	170, 180,	170, 180	170, 180, 200, 210
13.	SSR201	100, 120, 210, 240	100, 120, 210, 240	100, 120, 210, 240	100, 120
14.	SSR44	-	-	175, 260,	175, 250
15.	SSR73	260, 270, 290, 350, 380, 390	260, 270, 290, 350, 380, 390	350, 380, 390	380, 390
16.	Z1063	180, 250, 260, 280, 300	180, 235, 250, 260, 300	180, 250, 260, 300	-
17.	AW031453	-	-	-	200, 280, 300, 380
18.	AW037347	200	155, 200	-	175, 240
19.	TOM59-60	120, 130, 165, 170, 200, 225	120, 165, 200, 210, 225	120, 130, 165, 200	-
20.	NM110278976	120, 145, 175, 225, 250	120, 145, 225, 250	120, 145, 175, 225, 250	110, 115, 145, 175, 265
21.	SLR3	160, 170, 180, 190, 200	115, 160, 180, 200	160, 170, 180, 190, 200	160, 170, 175, 190
22.	SSR128	110, 125, 140, 150, 160	110, 125, 140, 150, 160	110, 125, 140, 150, 160	110, 125, 130, 150, 160, 170
23.	SSR146	180, 190, 210, 225, 330, 398	180, 190, 210, 225, 330, 398	180, 190, 225, 398	125, 225, 245, 250
24.	SSR15	110, 130, 145, 225	110, 130, 145, 225	110, 130, 145, 180, 225	110, 180, 190, 200, 225, 230
25.	SSR134	175, 180, 190, 215, 240, 490, 580	175, 180, 190, 215, 240, 580	-	175, 180, 190, 215
26.	SSR201	100, 120, 210, 240	100, 120, 210, 240	100, 120, 210, 240	100, 120
27.	SSR214	100, 130, 200, 245, 260	230, 245, 260	235, 245, 260	100, 110, 130, 200, 230, 245, 260
28.	SSR192	135, 170, 190, 245, 260, 280, 410	135, 170, 190, 245, 280, 410	110, 135, 170, 190, 235, 245, 260, 280, 410	110, 170, 180, 190
29.	SSR20	110, 130, 180, 195, 205, 250, 320	110, 130, 160, 180, 195, 205, 250, 320	110, 130, 180, 195, 205, 250, 320	110, 160, 170
30.	SSR162	140, 165, 190, 200, 210, 240, 250, 275,	140, 165, 190, 200, 210, 240, 250, 275	140, 165, 190, 200, 210, 240, 250, 275	125, 140, 165, 190, 200, 210, 240, 250, 275
31.	SSR32	175, 190, 200,	175, 190, 200,	175, 190, 200,	175, 180, 190
32.	SSR333	140, 150, 175, 300, 310, 330, 350, 360	140, 300	150, 175, 300, 310, 330, 350, 360	140, 150, 175, 200, 220, 250, 260
33.	SSR344	100, 175, 275, 300,	175, 275, 300, 320, 330,	100	100, 160, 175, 190,

		320,330,		175,275,300,320,330,	275, 300, 320, 330
34.	SSR345	160, 170, 200, 210,225,	-	160,170,200,210,225,300	-
35.	SSR46	120,140,150,165, 250,280,340,350, 370,400	120,140,150,165,250,280,340,350,370,400	120,140,150,165,250,280,340,350,370,400	250, 280, 340, 350, 370, 400
36.	SSR450	270,300,370,	260, 270,300,370,	270,300,370,	260, 270, 300, 310
37.	SSR565	140,175,200,260, 300,370,380,	140,175,200,260,300,370,380,	140,175,200,260,300,370,380,	370, 380
38.	SSR603	105,210,, 290, 300, 320, 400	105,210,, 290, 300, 320, 400	170,,210,, 290, 300, 320, 400	170, 210, 250, 290, 300
39.	TGO302	210,230,250,1,260, 320,350,370	210,230,250,1,260,320,350,370	140, 210,230,250,1,260,320,350,370	600
40.	TFSUR1	300,360,380,400	300,360,380,400	300,360,380,400	100, 500
41.	TG479	145,175,200,	200	200	175, 380
42.	TOM160-161	200,215,250,300	190,200,215,250,300	130,190,200,215,250,300,380	200, 215
43.	TOM49-50	115,165,225,250	115, 165,225,250	-	165
44.	TOM31a-32a	130,140,175,190, 250,275,350	130,140, 175,190,250,275,350	130, 175,190,210	130, 190, 200, 210, 230, 250
45.	TOM55-56	160,170,200,250, 260,	160,170,200,250,260,230	160,170,200,250,260,230	160, 170, 180
46.	SSR276	150,160,	150,160,	150,160,	190, 200, 270, 290, 350, 380
47.	U81986	190,220,270	270	190,250	170, 180
48.	XM010323394	110, 120, 170, 180, 200, 240	110, 120, 170, 180, 200, 240	110, 120, 170, 180, 200, 240	110, 120, 170, 180, 200, 240
49.	SSR86	200, 210, 220, 230, 270, 290	200, 210, 220, 230, 270, 290	200, 210, 220, 230, 270, 290	200, 210, 220, 230, 270, 290
50.	SSR94	140, 190, 200, 210, 225	140, 190, 200, 210, 225	140, 190, 200, 210, 225	140, 190, 200, 210, 225

Cultivar Identification Diagram (CID)








Results/Remarks

Cultivar Identification Diagram (CID) presenting the association among standard hybrid (Salar-F1, Sandal-F1 and Sundar-F1) and candidate hybrid (Samar F1) was generated by Unweighted paired group method with arithmetic means (UPGMA). X-axis represents genetic similarity coefficient between genotypes which ranged from 0.44 to 0.96. CID results concluded that candidate hybrid Samar F1 varied significantly from the standard varieties i.e. Salar-F1, Sandal-F1 and Sundar-F1 showing 41%, dissimilarity.

However, Samar-F1 and Marjan-F1 which are newly evolved hybrids showed 96% genetic similarity.

	Analyst/Prepared By:	Focal Person/Checked By:	Chief Scientist/ Director
Signature:			
Stamp:			
Name:			
Designation	Rahil Shahzad Scientific Officer	Ms. Shakra Jamil Botanist Biotechnology	Dr. Sajid Ur Rahman Chief Scientist