

OUTPUT 7

Development of genetic stocks and improved gene pools adapted to the sub-humid environments.

Cassava genetic improvement at CIAT has three main target environments: in the sub-humid (Output 4), acid-soil savannas (Output 5) and mid-altitude valleys (Output 6). Additional activities are conducted in the Córdoba – Sucre Departments (Activity 7.1); Middle-Magdalena River Region (Activity 7.2); Tolima-Huila Departments (Activity 7.3); and the highlands (Activity 7.4). Below there is a brief description of the most important results from these regions.

Activity 7.1. Evaluations and selections in Córdoba and Sucre Departments

The activities in the Sucre and Córdoba Departments are closely associated with those from the Atlántico and Magdalena Departments described in Output 4. In the former, however, precipitations are higher than in the latter. The main biotic stress in Córdoba and Sucre is the Bacterial Blight (*Xanthomonas axonopodis* pv. *Manihotis* also known as *X. campestris* pv. *manihotis*) and to a lesser degree the super elongation disease induced by *Elsinoe brasiliensis* (also known as *Sphaceloma manihoticola*). In the Atlántico and Magdalena regions, on the other hand the main biotic stress is induced by mites in addition to the abiotic stress resulting from the long period without rains (from late December to early May). Many cassava genotypes will show a good performance across these two environments.

Table 7.1 lists the 32 clones included in one Regional Trial evaluated in three locations in the Córdoba and Sucre Departments. These trials were based on three replications of 25-plant plots. Bold highlighted in the table are two traditional clones for this region (CG 1141-1 and CM 3306-4).

Average dry matter productivity was close to 13 t/ha, highlighting the huge potential that cassava has to compete with other (imported) commodities such as maize. Moreover, five clones yielded more than 15 t/ha of root dry matter and nine clones yielded more than the best check (CG 1141-1 = 13.88 t/ha).

Two clones from family SM 2775 were among the best six clones. Also showing a good performance was clone CM 4919-9 ranked 11th based on its dry matter productivity (13.63 t/ha). This clone was recently released as CORPOICA-Verónica.

Table 7.1. **Regional trials** conducted in three locations Ciénaga de Oro and Valencia (Córdoba Department) and La Unión (Sucre Department). Ordering of clones based on dry matter yields. In bold the two traditional checks for this region.

Clon	Plant Type (1-5)	Fresh root yield (t/ha)	Foliage yield (t/ha)	Harvest Index (0-1)	Dry matter content (%)	Dry root yield (t/ha)
SM 2772-5	2.44	46.04	42.20	0.56	35.57	16.41
SM 2621-29	2.28	43.12	31.99	0.61	36.85	15.87
SM 2775-2	1.67	47.78	28.74	0.66	33.22	15.85
SM 2771-5	2.33	42.90	45.81	0.53	35.97	15.46
SM 2545-22	1.89	43.02	32.44	0.60	35.29	15.12
SM 2775-4	1.78	39.06	31.04	0.59	38.37	14.98
SM 2548-22	2.00	43.32	28.44	0.63	33.73	14.70
SM 2629-36	2.00	40.60	33.52	0.61	35.74	14.46
SM 1438-2	2.33	38.56	37.81	0.53	36.93	14.33
CG 1141-1	2.00	38.73	28.89	0.59	35.80	13.88
CM 4919-1	1.33	39.17	19.09	0.72	34.44	13.63
SM 2769-11	1.67	40.73	30.65	0.61	33.08	13.56
SM 2619-4	2.22	35.69	29.09	0.57	37.68	13.53
CM 9456-10	3.11	38.15	42.67	0.52	35.28	13.50
SM 2620-1	2.33	36.49	29.43	0.60	36.11	13.26
CM 9456-12	2.33	36.15	21.09	0.68	35.64	12.89
SM 2616-6	2.44	33.80	31.93	0.55	37.84	12.79
SM 2625-1	2.56	34.97	33.48	0.55	36.41	12.75
SM 2781-6	1.89	38.69	39.35	0.51	32.59	12.46
SM 2623-6	2.33	33.51	30.24	0.56	35.93	12.06
SM 2773-21	2.56	30.55	29.76	0.56	38.31	11.74
SM 2780-17	1.78	33.75	23.11	0.63	34.39	11.71
SM 2618-8	2.67	32.27	36.28	0.50	36.17	11.65
SM 2546-40	2.44	32.29	24.89	0.59	35.78	11.62
SM 2615-25	2.78	30.72	26.24	0.57	37.52	11.57
MTAI 8	2.44	32.38	32.63	0.53	35.00	11.38
CM 9560-1	2.44	33.43	26.70	0.60	33.57	11.28
CM 3306-4	2.89	27.85	22.52	0.58	38.18	10.64
SM 2782-9	3.00	29.03	31.74	0.50	35.45	10.30
SM 2612-24	3.11	28.88	23.80	0.58	33.98	9.85
SM 2599-9	3.00	27.33	28.61	0.52	35.16	9.63
SM 2616-11	3.00	26.94	16.28	0.66	35.28	9.53
Maximum	3.67	52.69	45.81	0.72	39.15	17.98
Minimum	1.00	17.94	16.28	0.45	32.23	6.52
Average	2.35	36.12	30.33	0.58	35.66	12.89
St.Deviation	0.66	7.85	6.68	0.06	1.75	2.70

Table 7.2 presents the result of another **Regional Trial (RT)** conducted in the same three locations as the previous one, but with only 30 genotypes evaluated. Average root dry matter yield was also excellent (12 t/ha). The two varieties recently released CM 4843-1 (CORPOICA-Ginés) and CM 4919-9 (CORPOICA-Verónica) showed a good performance (6th and 9th, respectively, based on their dry matter productivity). SGB 765-4 another clone released few years ago, on the other hand showed a poor performance.

Table 7.2. **Regional trials** conducted in three locations Valencia and Ciénaga de Oro (Córdoba Department) and La Unión (Sucre Department). Ordering of clones based on dry matter yields. In bold the two traditional checks for this region.

Clon	Plant type (1-5)	Fresh root yield (t/ha)	Fresh foliage yield (t/ha)	Harvest Index (0-1)	Dry matter content (%)	Dry matter yield (t/ha)	Selection index
SM 1411-5	2.0	42.3	29.5	0.58	35.7	15.2	20.5
SM 1665-2	3.8	43.5	22.8	0.65	33.3	14.6	5.0
SM 1511-6	2.8	38.5	31.9	0.56	36.3	14.1	10.4
SM 1433-4	2.2	40.7	25.6	0.61	34.6	14.0	12.1
SM 1565-17	2.3	43.9	25.2	0.62	31.5	14.0	1.4
CM 4843-1	3.4	39.5	23.2	0.62	34.7	13.8	5.5
SM 1669-7	2.6	36.6	26.9	0.60	37.2	13.7	15.5
MTAI 8	2.1	37.0	21.8	0.63	36.5	13.6	18.4
CM 4919-1	2.4	37.1	16.1	0.71	35.1	13.3	14.1
CM 3306-19	3.1	37.8	24.1	0.60	34.7	13.3	4.0
MVEN 169	3.2	37.0	26.7	0.57	35.0	13.0	1.6
SM 1438-2	3.6	34.4	29.0	0.55	37.4	12.9	5.1
SM 805-15	3.2	38.2	26.3	0.59	33.8	12.9	-0.4
M VEN 25	2.4	34.7	27.7	0.56	36.1	12.5	6.9
SM 2081-34	3.1	35.6	34.2	0.51	34.4	12.3	-7.4
SM 1973-25	3.9	33.2	36.3	0.47	36.2	11.9	-8.6
SM 1521-10	2.8	36.5	20.7	0.65	32.5	11.9	-3.7
SM 1427- 1	3.4	33.4	25.3	0.58	35.0	11.7	-3.5
SM 1669-5	3.1	31.8	21.2	0.61	36.0	11.5	1.3
MPAN 135	2.8	32.9	27.8	0.53	34.5	11.4	-5.8
SM 1759-29	2.0	30.8	27.9	0.51	36.9	11.3	3.2
SM 1127-8	1.7	30.1	21.7	0.57	36.3	11.0	6.7
SM 2192-6	3.6	31.5	31.3	0.52	34.5	10.9	-15.8
CM 6119-5	2.2	28.6	16.9	0.63	36.6	10.6	5.3
SM 1656-7	3.0	28.0	21.4	0.57	36.0	10.2	-4.7
CM 9067-2	3.6	28.8	23.6	0.55	35.2	10.2	-12.1
SGB 765-4	3.8	25.7	35.1	0.39	35.6	9.5	-27.5
SM 1637-22	3.2	25.4	14.9	0.62	36.4	9.3	-4.7
CM 6754-8	3.9	26.9	16.4	0.60	34.3	9.2	-18.0
SM 2450-5	3.4	21.3	17.8	0.57	34.8	7.5	-24.8
Parameters of the 30 clones evaluated							
Maximum	4.4	49.1	43.3	0.72	38.1	16.7	30.7
Minimum	1.3	18.6	12.2	0.36	31.0	6.6	-39.8
Average	3.0	34.1	25.0	0.58	35.2	12.0	0.0
St. Deviation	0.8	7.3	7.2	0.07	1.7	2.5	15.9

In a very large experiment evaluating *RT* in 11 different locations the Eberhardt and Russell stability analysis suggested that the two clones evaluated and selected by farmers in a farmer's participatory breeding project showed the highest regression coefficients. That suggested that these clones were particularly well adapted to the better growing conditions, which was a surprise. In general selections conducted in the more limiting conditions and cultural practices of farmers was expected to select for genotypes particularly adapted to

harsh environmental conditions. This study prompted a second one in which only eight genotypes were grown. These trials will be conducted at several locations and for two consecutive years. Table 4.14 showed the results of the combined analysis across the three locations in the Atlántico Department where these trials were planted. Table 7.3 below presents the results from the same experiment for four locations in the Córdoba and Sucre Departments. The two clones developed through a participatory approach (SGB 765-2 and SGB 765-4) showed the two lowest dry matter yields (around 7-8 t/ha) and only CM 3306-19 showed lower dry matter yields. The two clones recently released (CM 4843-1 and CM 4919-9) had a considerably better performance with dry matter yields around 10 t/ha.

Table 7.3. Evaluation of eight clones in a special study to compare performances of clones released by traditional and farmers' participatory approaches. Trials were based on three replications with 25-plant plots and planted in four locations Ciénaga de Oro, and Sahagun (Córdoba Department) and La Unión, and Sincelejo (Sucre Department).

Clon	Plant type (1-5)	Fresh root yield (t/ha)	Fresh foliage yield (t/ha)	Harvest Index (0-1)	Dry matter content (%)	Dry matter yield (t/ha)
SM 1411-5	1.92	32.03	24.00	0.58	35.28	11.29
SM 1565-17	2.67	35.85	19.30	0.67	30.60	11.04
CM 4843-1	4.58	31.23	19.16	0.63	34.37	10.74
CM 4919-1	1.17	28.00	11.94	0.71	34.72	9.74
CM 3555-6	1.88	28.83	20.57	0.59	32.46	9.13
SGB 765-2	3.67	22.12	20.09	0.54	35.30	7.82
SGB765-4	3.67	19.78	24.29	0.46	35.57	7.03
CM 3306-19	2.42	20.19	12.51	0.63	33.65	6.70
Parameters of the 8 clones evaluated						
Maximum	4.58	35.85	24.29	0.71	35.57	11.29
Minimum	1.17	19.78	11.94	0.46	30.60	6.70
Average	2.74	27.25	18.98	0.60	33.99	9.19
St. Deviation	1.14	5.95	4.61	0.08	1.71	1.82

Activity 7.2. Evaluations and selections in Middle-Magdalena River Region.

The middle Magdalena River region is important for two reasons. It includes economically poor regions, with very little development options and plagued with social unrest. Cassava can play an important role in reducing the poverty and social problems and tension. A second important fact about this region is that it also includes the most important poultry – related activities in the country. The large poultry facilities in the region are ideal markets for the commodities produced by the *Trapiches Yuqueros* (see Output 8) that have been or will be set up in the region.

A *CET* was planted during the 2002-2003 season in San Pablo (Norte de Santander Department) from which a total of 144 clones were selected. During the 2003-2004 season these 144 clones were planted in three different *PYT* trials with 48 clones each. Tables 7.4 to 7.6 describe the most important results from these *PYT* trials.

Table 7.4. Results from the *PYT-1* planted in San Vicente (Norte de Santander Department).

Clon	Plant type	Fresh root yield	Fresh foliage yield	Harvest Index	Dry matter content	Dry matter yield	Selection index
	(1-5)	(t/ha)	(t/ha)	(0-1)	(%)	(t/ha)	
SM 2859-3	1.7	37.5	19.2	0.66	29.6	11.1	33.6
SM 2830-3	2.0	32.2	16.0	0.67	32.2	10.3	32.0
CM 9903-150	1.3	27.2	16.5	0.62	33.2	9.1	27.8
GM 212-57	3.0	30.1	18.9	0.61	33.5	10.1	23.9
CM 9614-11	4.0	35.7	17.3	0.67	29.4	10.3	18.4
GM 235-86	1.7	21.7	14.5	0.60	33.8	7.3	17.3
CM 9772-7	2.7	25.8	10.4	0.73	30.2	7.7	15.6
SM 2967-7	2.0	29.9	21.7	0.59	29.8	9.0	14.9
SM 2826-2	3.0	24.1	18.4	0.57	33.8	8.2	11.9
CM 9614-2	2.0	26.4	13.9	0.66	29.1	7.7	11.8
SM 2963-45	3.0	23.8	7.3	0.76	29.8	7.1	11.6
GM 235-103	1.7	24.3	10.4	0.70	28.5	6.9	10.9
CM 9614-9	1.7	22.7	14.6	0.60	31.2	7.1	10.4
CM 9928-2	1.7	24.2	10.9	0.69	28.3	7.0	9.1
GM 212-61	3.3	23.2	16.4	0.58	33.4	7.8	8.2
Average	2.3	27.2	15.1	0.65	31.0	8.5	17.2
Parameters of the 48 clones evaluated							
Maximum	5.0	37.5	29.0	0.76	33.8	11.1	33.6
Minimum	1.3	7.0	4.6	0.43	22.9	2.2	-39.5
Average	2.6	22.9	14.5	0.61	29.1	6.7	0.0
St. Deviation	0.9	6.1	4.7	0.07	2.4	1.9	16.2

Table 7.5. Results from the *PYT-2* planted in San Vicente (Norte de Santander Department).

Clon	Plant type	Fresh root yield	Fresh foliage yield	Harvest Index	Dry matter content	Dry matter yield	Selection index
	(1-5)	(t/ha)	(t/ha)	(0-1)	(%)	(t/ha)	
CM 8335-18	1.7	39.0	17.6	0.69	28.2	11.1	36.0
CM 9748-15	1.3	25.4	16.0	0.63	33.4	8.5	33.2
CM 9614-22	2.0	26.1	11.7	0.70	31.3	8.1	26.6
CM 9940-61	1.3	30.1	21.7	0.60	30.1	9.2	24.4
GM 266-162	2.3	32.0	20.8	0.62	29.5	9.6	21.8
CM 9614-17	1.7	26.0	9.1	0.74	28.8	7.5	20.9
CM 9614-20	2.0	31.3	12.9	0.68	27.3	8.7	16.9
SM 2861-42	1.7	22.4	14.8	0.61	31.0	6.9	15.2
CM 9614-18	2.3	33.0	16.5	0.68	26.6	8.7	15.0
CM 9953-146	1.7	25.3	10.8	0.70	27.4	6.8	11.1
SM 2967-12	2.3	28.0	23.8	0.57	29.3	8.3	10.0
GM 266-163	2.3	21.0	10.9	0.66	30.1	6.5	9.0
SM 2864-27	1.7	23.4	16.0	0.60	29.0	6.8	7.6
CM 9748-26	2.7	22.3	12.0	0.66	29.5	6.5	6.8
CM 9934-15	1.3	26.4	14.6	0.65	26.5	7.0	6.7
Average	1.9	27.5	15.3	0.65	29.2	8.0	17.4
Parameters of the 48 clones evaluated							
Maximum	4.7	39.0	29.0	0.78	33.4	11.1	36.0
Minimum	1.3	7.1	5.3	0.48	23.1	1.9	-46.8
Average	2.6	22.3	14.4	0.62	28.6	6.3	0.0
St. Deviation	0.9	6.1	5.3	0.07	1.9	1.7	16.2

Table 7.6. Results from the *PYT-3* planted in San Vicente (Norte de Santander Department).

Clon	Plant type (1-5)	Fresh root yield (t/ha)	Fresh foliage yield (t/ha)	Harvest Index (0-1)	Dry matter content (%)	Dry matter yield (t/ha)	Selection index
GM 235-104	2.3	35.9	25.2	0.59	30.0	10.8	29.3
SM 2733-137	2.0	35.0	29.2	0.55	28.8	10.1	22.2
GM 235- 101	2.3	32.4	21.0	0.62	29.0	9.6	21.6
CM 9772-26	2.7	33.9	18.4	0.65	28.3	9.6	19.8
SM 2963-58	1.3	26.8	18.0	0.60	29.2	7.9	19.5
CM 9772-24	2.7	31.7	24.2	0.58	29.6	9.4	19.5
CM 9940-59	1.7	31.1	16.4	0.66	27.6	8.7	19.1
CM 9940-64	2.3	35.0	27.3	0.55	28.3	9.9	18.1
CM 9614-25	2.7	30.4	17.4	0.65	28.5	9.0	16.1
SM 2963-53	1.7	24.7	23.8	0.51	30.2	7.5	15.4
SM 2826-20	2.3	26.5	15.4	0.64	29.0	7.5	15.1
CM 9748-24	3.0	25.3	19.1	0.58	30.3	7.7	12.1
CM 9953-156	2.0	19.6	7.6	0.86	27.2	5.2	11.4
CM 9748-22	2.3	20.3	14.6	0.60	30.3	6.1	10.4
CM 9903-171	3.3	33.8	15.3	0.67	26.9	9.1	10.2
Average	2.3	29.5	19.5	0.62	28.9	8.5	17.3
Parameters of the 48 clones evaluated							
Maximum	4.7	35.9	35.7	0.86	31.1	10.8	29.3
Minimum	1.3	6.6	5.0	0.38	23.7	2.0	-38.5
Average	2.7	23.7	17.3	0.59	27.8	6.6	0.0
St. Deviation	0.8	7.6	7.3	0.09	1.7	2.2	16.7

In general these *PYT*s were uniform with an average dry matter productivity of 6.7; 6.3; and 6.6 t/ha respectively for *PYT1*, *PYT2*, and *PYT 3*. Several of the selected clones produced more than 10 t/ha of dry matter, a very competitive yield potential.

Activity 7.3. Evaluations and selections in Tolima-Huila Departments Region.

The Tolima-Huila Departments region falls into the mid-altitude valleys environment. They belong to the geographic Magdalena River Valley. However they present large economic, social and environmental differences with the geographic Cauca River Valley, which involves the Departments of Cauca, Valle del Cauca, Quindío and Caldas. The later valley is much more developed, with excellent fertile land and adequate rainfall. The former, on the other hand presents arid and semiarid areas, and is considerably less developed economically and socially. In addition to the problems of drought, a major biotic problem, shared with the Cauca and Valle del Cauca Departments, is the pressure exerted by white flies.

During the 2003-2004 seasons, a Clonal Evaluation Trial or *CET* (see Output 3) was planted in this region to evaluate 213 clones derived from elite parents that were expected to produce good progenies for this environment. The trial however was recently harvested and data was not analyzed yet and, therefore, results cannot be presented herein. Selected genotypes will be grouped, as usual, for a second evaluation stage as *PYT*.

In addition to the *CET*, a Regional Trial or *RT* was planted in three locations in the Tolima Department. Table 7.7 presents a summary of the combined analysis of such *RT*. It included the best germplasm from different regions and environments. It was very interesting to observe that the best performing clone (dry matter yield wise) was CM 4843-1, the clone recently released for the Sub-humid environment. This clone showed good fresh root yield combined with high dry matter content, resulting in an average yield of 12.1 t/ha of dry matter. MTAI 8 was the second best performing clone. The best two clones, therefore, are adapted to sub-humid conditions. The third best yielding clone (dry matter wise) was SM 1219-9, which is adapted to the acid-soils environment. None of these materials are known to have resistance or tolerance to whiteflies. Its recommendation for planting in this region, therefore, will require a careful analysis of their response to this pest.

Table 7.7. Regional trials conducted in three locations Armero, Ortega and Natagaima (Tolima Department).

Clon	1 st Branching Height (cm)	Number of branchings (#)	Fresh root yield (t/ha)	Fresh foliage yield (t/ha)	Harvest Index (0-1)	Dry matter content (%)	Dry matter yield (t/ha)
CM 4843-1	68.9	2.0	34.2	18.4	0.65	35.6	12.1
MTAI-8	0.0	0.0	32.7	15.1	0.69	34.6	11.3
SM 1219-9	85.0	2.0	30.4	14.1	0.68	31.4	9.7
MVEN-25	0.0	0.0	26.6	14.1	0.66	33.0	8.9
SM 1433-4	0.0	0.0	25.7	13.7	0.65	34.4	8.9
SM 653-14	0.0	0.0	27.6	14.8	0.64	31.2	8.8
MBRA-383	0.0	0.0	26.2	15.4	0.61	32.2	8.5
CM 7951-5	82.2	3.0	26.9	13.0	0.68	31.5	8.5
CM 523-7	107.2	2.0	23.1	14.2	0.63	35.6	8.2
SM 1741-1	43.9	2.0	25.0	16.3	0.61	31.3	8.0
CM 3306-4	82.2	3.0	22.2	17.9	0.55	33.9	7.6
CG 1141-1	15.0	1.0	21.0	16.0	0.57	33.3	7.0
CM 7514-7	82.8	2.0	19.8	14.1	0.59	34.8	6.8
CM 6119-5	0.0	0.0	23.5	14.1	0.61	27.4	6.8
SM 1557-17	158.3	2.0	20.7	16.5	0.54	28.2	6.1
HMC-1	37.2	3.0	19.7	14.0	0.58	29.6	6.0
MPER 183	40.0	3.0	21.2	13.1	0.61	27.1	5.9
CM 849-1	50.6	2.0	17.8	16.5	0.53	25.0	5.0
Parameters of the 18 clones evaluated							
Maximum	158.3	3.0	34.2	18.4	0.69	35.6	12.1
Minimum	0.0	0.0	17.8	13.0	0.53	25.0	5.0
Average	47.4	1.5	24.7	15.1	0.62	31.7	8.0
St. Deviation	46.1	1.2	4.6	1.6	0.05	3.1	1.9

Activity 7.4. Evaluations and selections in the Highlands Region.

Certain regions of Colombia ranging from 1400 to 1800 meters above sea level depend heavily on growth of cassava. The main use of that cassava is for the production of fermented starch by many small and simple processing facilities. The social impact of this activity is large and therefore justifies some breeding work in spite of the relatively small area involved. In addition to the relevance for Colombia, highland cassava germplasm is important for Asia

(production of foliage) and for highland areas of Africa (root production). This environment presents the advantage of being whitefly-free. Therefore, this germplasm can be directly adopted in African regions without the need of introducing into it tolerance of resistance to the African Cassava Mosaic Virus.

Table 7.8 presents a summary of a Regional Trial involving several experimental clones specifically adapted to the highland environment. Dry root yield was outstanding, although it has to be mentioned that in this environment cassava is usually harvested at 18 months of age.

Table 7.8. Regional trial conducted in Popayán (Cauca Department). Ordering of clones based on selection index (not included in the table).

Clon	Plant Type (1-5)	Fresh root yield (t/ha)	Foliage yield (t/ha)	Harvest Index (0-1)	Dry matter content (%)	Dry root yield (t/ha)
SM 1707-41	4.0	50.9	31.1	0.62	38.6	20.1
SM 1713-25	3.3	47.9	69.6	0.41	38.6	17.8
CM 7595-1	3.7	50.5	43.6	0.54	35.8	17.8
SM 1712-10	2.3	47.8	69.2	0.41	39.9	19.1
SM 1495-5	3.0	53.7	71.3	0.43	36.8	19.2
SM 1834-28	3.0	53.0	59.1	0.47	35.4	18.7
SM 1834-20	2.3	57.1	45.5	0.56	34.5	18.6
SM 1992-1	3.3	48.6	64.5	0.43	35.6	17.3
CM 7138-7	2.0	47.3	61.0	0.44	37.6	16.5
SM 1942-17	3.0	41.3	53.9	0.44	37.1	15.9
SM 1498-4	2.7	48.3	52.7	0.48	35.6	16.0
CM 7438-14	3.7	37.8	66.2	0.38	37.4	13.0
SM 1940-12	3.7	38.0	43.1	0.47	36.1	13.9
SM 1702-23	3.3	39.7	51.0	0.44	35.4	13.4
CM 7436-7	2.0	50.8	60.9	0.45	34.9	18.7
SM 1703-22	3.3	34.5	87.3	0.28	38.2	12.7
COL 2061	4.3	24.4	15.6	0.60	34.6	7.6
SM 1835-15	2.0	48.6	53.7	0.47	34.0	16.5
CM 8596-6	2.7	34.7	47.9	0.42	36.2	12.6
SM 1713-26	3.0	33.6	62.5	0.35	36.5	10.3
SM 524-1	3.3	30.6	45.7	0.40	35.3	10.5
CG 402-11	3.0	39.7	47.0	0.46	32.9	14.1
SM 1934-9	2.7	31.6	69.0	0.32	36.7	11.7
SM 1936-4	3.7	26.6	66.1	0.29	36.4	9.6
SM 1846-12	3.3	30.0	65.6	0.31	35.6	10.9
COL 2261	4.0	32.0	54.3	0.37	33.4	11.8
CM 8296-4	4.0	28.0	51.9	0.35	33.5	9.7
COL 1522	2.3	26.1	58.4	0.31	34.6	8.4
SM 1707-41	4.0	50.9	31.1	0.62	38.6	20.1
Maximum	4.3	57.1	87.3	0.62	39.9	20.1
Minimum	2.0	24.4	15.6	0.28	32.9	7.6
Average	3.1	40.5	56.0	0.43	35.9	14.4
St.Deviation	0.7	9.8	13.9	0.09	1.7	3.7

Table 7.9. Regional trial conducted in Vereda Santa Rosa near Popayán (Cauca Department). Ordering of clones based on selection index (not included in the table).

Clon	Cooking quality (1-5)	Fresh root yield (t/ha)	Foliage yield (t/ha)	Harvest Index (0-1)	Dry matter content (%)	Dry root yield (t/ha)
SM 524-1	3.0	56.0	59.0	0.49	36.3	20.3
SM 1061-5	2.0	56.5	45.0	0.56	30.8	17.4
COL 1522	2.0	43.6	20.5	0.68	37.0	16.1
SM 2233-11	4.0	38.8	49.8	0.44	39.9	15.4
CM 7438-14	1.0	42.2	44.4	0.49	36.1	15.2
CG 402-11	1.0	42.9	25.0	0.63	33.7	14.4
SM 1835-28	3.0	41.9	52.3	0.45	34.5	14.4
SM 1495-22	5.0	41.9	56.0	0.43	32.4	13.5
SM 2227-21	1.0	37.1	54.0	0.41	36.4	13.5
SM 1058-13	1.0	42.8	26.4	0.62	31.4	13.4
SM 2226-48	4.0	37.9	54.0	0.41	35.4	13.4
SM 850-1	3.0	42.4	33.4	0.56	31.7	13.4
SM 998-3	3.0	38.2	46.7	0.45	34.5	13.2
SM 2229-36	1.0	37.5	36.9	0.50	35.1	13.2
SM 1946-2	5.0	42.0	27.2	0.61	30.9	12.9
SM 1053-23	4.0	36.9	26.8	0.58	34.8	12.8
CM 8106-4	3.0	36.0	60.1	0.37	35.6	12.7
COL 2261	3.0	35.4	26.1	0.57	34.9	12.4
CM 7138-12	3.0	32.7	39.0	0.46	37.2	12.2
SM 1938-12	5.0	44.6	34.5	0.56	25.1	11.2
COL 2740	2.0	32.3	35.2	0.48	34.9	11.2
SM 1937-1	5.0	30.9	55.7	0.37	34.4	10.6
SM 1703-17	2.0	28.6	51.6	0.36	35.3	10.1
SM 1944-10	3.0	27.9	54.3	0.34	36.1	10.0
COL 2061	2.0	26.1	63.8	0.29	33.1	8.6
CM 7190-2	2.0	23.9	38.0	0.37	35.9	8.6
SM 1933-5	5.0	22.7	56.5	0.29	34.4	7.9
SM 2311-3	2.0	23.7	58.8	0.29	30.8	7.3
SM 1833-21	2.0	21.3	58.6	0.26	32.4	6.9
Maximum	5.0	56.5	63.8	0.68	39.9	20.3
Minimum	1.0	21.3	20.5	0.26	25.1	6.9
Average	2.8	36.7	44.5	0.46	34.1	12.5
St.Deviation	1.3	8.9	13.0	0.11	2.8	3.0

Table 7.9 presents the results of a second **Regional Trial** including a different group of experimental clones. As in the previous case, dry matter productivity was excellent and varied largely (from 20.3 to 6.9 t/ha).

There were some clones that participated in both *RTs*. SM 524-1 showed the highest dry matter yield in the second *RT* (20.3 t/ha) but was mediocre in the first trial with half that productivity (10.5 t/ha dry matter). Two clones from family SM 1495-5 and SM 1495-22 showed an outstanding performance in the first and second trials, respectively. Clone CM 7438-14 yielded relatively well in both trials.