



Appendices

Appendix 1: Computer tabulated raw data on the field performance of the elite breeding lines and the control, TL33, at the ARC-TCRI in the 1998/1999 season.

PLOT	BLOC	REP	ENTR	DTPM	NLP	PHT	FV/FM	2LL (cm)	2LW (cm)	2LA (cm ²)	10LL (cm)	10LW (cm)	10LA (cm ²)	18LL (cm)	18LW (cm)	18LA (cm ²)	SLA (cm ²)	WPLA (cm ²)
1	1	1	4	55	21.50	100.50	0.79	47.60	25.10	757.50	69.80	31.90	1411.70	60.60	22.90	879.80	825.50	17748.25
2	1	1	11	55	22.10	107.90	0.77	46.10	16.60	485.20	68.80	28.30	1234.40	63.60	25.20	1016.10	884.30	19543.03
3	1	1	2	53	20.00	118.10	0.65	56.30	33.70	1188.60	77.10	39.30	1921.00	61.60	31.80	1241.90	1379.00	27580.00
4	1	1	8	55	24.00	119.40	0.52	45.20	20.70	593.20	66.60	31.20	1317.40	69.10	22.30	976.90	1137.30	27295.20
5	1	1	3	54	24.10	114.50	0.78	53.80	34.60	1180.20	76.50	34.60	1678.10	60.60	25.30	972.00	1026.90	24748.29
6	1	1	6	55	21.70	121.00	0.76	58.70	21.90	815.00	76.70	35.20	1711.70	71.20	26.10	1178.20	1476.60	32042.22
7	1	1	5	55	20.40	119.40	0.72	64.00	42.90	1740.70	74.90	36.30	1723.80	74.30	36.10	1700.50	1344.00	27417.60
8	1	1	7	54	23.20	113.70	0.81	57.80	31.80	1165.30	71.30	34.40	1555.00	61.50	24.90	970.10	820.70	19040.24
9	1	1	9	57	21.40	100.30	0.81	49.10	22.30	694.20	68.30	30.20	1307.70	52.40	26.10	867.10	786.70	16835.38
10	1	1	1	56	23.60	110.40	0.68	63.20	35.10	1406.40	77.80	31.80	1568.50	70.00	31.90	1415.70	1407.10	33207.56
11	1	1	10	52	21.90	112.40	0.81	57.00	28.30	1022.70	78.20	39.30	1948.40	76.60	35.50	1724.00	1449.60	31746.24
12	1	1	12	56	25.10	122.90	0.75	44.10	17.40	486.50	63.50	25.00	1006.50	74.80	30.30	1436.90	1281.70	32170.67
13	1	2	3	60	22.00	108.80	0.78	62.70	39.50	1570.20	76.70	31.20	1517.20	60.50	24.70	947.40	1443.80	31763.60
14	1	2	5	60	19.90	117.90	0.81	59.10	38.40	1438.80	79.80	40.10	2028.80	65.70	30.40	1266.30	1857.00	36954.30
15	1	2	8	57	23.10	120.90	0.79	53.90	21.00	717.60	71.10	32.20	1451.50	76.90	26.50	1292.00	1306.00	30168.60
16	1	2	9	56	23.70	107.70	0.76	46.40	25.00	735.40	60.20	26.10	996.20	51.20	20.20	655.70	1187.10	28134.27
17	1	2	1	57	22.90	112.60	0.71	62.50	30.40	1204.60	78.70	36.10	1801.20	63.30	27.50	1103.60	1676.60	38394.14
18	1	2	10	54	22.30	118.30	0.78	58.10	26.40	972.50	74.70	38.80	1837.60	77.90	30.60	1511.30	1725.40	38476.42
19	1	2	7	57	23.40	110.60	0.81	52.10	21.50	710.20	66.10	27.40	1148.30	51.20	23.20	753.10	1425.20	33349.68
20	1	2	6	53	22.60	122.70	0.66	60.80	22.30	859.60	78.00	38.60	1908.80	71.30	34.60	1564.10	1838.00	41538.80
21	1	2	12	60	24.40	124.80	0.80	55.60	23.20	817.80	78.70	29.40	1466.90	73.30	33.20	1542.90	1203.90	29375.16
22	1	2	11	57	22.70	113.50	0.79	43.70	19.40	537.50	68.20	32.00	1383.60	51.70	22.50	737.50	1448.40	32878.68
23	1	2	4	53	21.50	116.30	0.81	39.80	20.60	519.80	60.00	27.90	1061.30	54.40	24.20	834.60	1320.20	28384.30
24	1	2	2	56	20.40	124.50	0.79	65.50	41.40	1719.20	72.70	36.40	1677.70	62.20	28.70	1131.80	1909.50	38953.80
25	1	3	9	56	22.20	106.80	0.75	44.20	23.30	652.90	61.40	32.30	1257.40	62.00	21.30	837.30	694.20	15411.24
26	1	3	6	56	22.90	122.90	0.66	51.60	22.40	732.80	75.80	39.40	1893.50	77.60	34.30	1687.50	802.50	18377.25
27	1	3	4	55	22.10	108.40	0.78	51.80	23.50	771.80	71.10	33.00	1487.60	53.90	22.30	762.00	683.00	15094.30
28	1	3	11	55	23.80	110.00	0.82	45.90	18.80	547.10	69.50	39.20	1727.30	61.40	23.10	899.20	523.30	12454.54
29	1	3	3	60	25.10	113.40	0.81	53.10	29.70	999.90	62.00	28.90	1136.00	62.30	29.40	1161.20	1250.10	31377.51
30	1	3	5	55	21.00	118.90	0.81	63.30	37.10	1488.90	71.30	40.00	1818.30	56.00	30.00	1065.10	1556.10	32678.10
31	1	3	2	56	21.00	124.80	0.81	54.20	38.20	1312.70	76.00	44.20	2129.70	76.20	36.50	1763.30	1406.80	29542.80
32	1	3	12	55	24.80	125.10	0.72	44.30	18.00	505.60	68.00	26.40	1138.20	66.90	20.40	865.30	603.30	14961.84
33	1	3	7	55	23.60	111.10	0.81	47.40	29.40	883.50	68.70	36.10	1572.40	55.70	20.90	738.10	919.70	21704.92
34	1	3	8	56	23.60	118.70	0.79	42.80	18.30	496.60	65.20	27.80	1149.20	69.60	25.90	1142.90	602.50	14219.00
35	1	3	1	60	23.40	111.40	0.80	52.20	30.30	1002.80	74.60	35.10	1660.10	71.40	37.60	1702.10	1204.60	28187.64
36	1	3	10	55	21.60	114.40	0.79	48.50	22.30	685.70	68.10	32.20	1390.20	62.50	28.10	1113.50	893.60	19301.76

DTPM Days to physiological maturity
 2LW Second leaf width
 18LL Eighteenth leaf length

NLP Number of leaves per plant
 2LA Second leaf area
 18LW Eighteenth leaf width

PHT Plant height at topping
 10LL Tenth leaf length
 18LA Eighteenth leaf area

FV/FM Chlorophyll a fluorescence
 10LW Tenth leaf width
 SLA Single leaf area

2LL Second leaf length
 10LA Tenth leaf area
 WPLA Whole plant leaf area

Appendix 2 Analysis of variance of the parameters of field performance of the elite breeding lines at the ARC-TCRI in the 1998/1999 season.

ENTRIES	DTPM	NLP	PHT	FV/FM	2LL	2LW	2LA	10LL	10LW	10LA	18LL	18LW	18LA	SLA	WPLA
					(cm)	(cm)	(cm ²)	(cm)	(cm)	(cm ²)	(cm)	(cm)	(cm ²)	(cm ²)	(cm ²)
OD1	57.67	23.30	111.47	0.73	59.30	31.93	1204.60	77.03	34.33	1676.60	68.23	32.33	1407.13	1429.43	33263.11
OD2	55.00	20.47	122.47	0.53	58.67	37.77	1406.83	75.27	39.97	1909.47	66.67	32.33	1379.00	1565.10	32025.53
OD486B	58.00	23.73	112.23	0.79	56.53	23.07	1250.10	71.73	31.57	1443.77	61.13	26.47	1026.87	1240.27	29296.47
TL33	54.33	21.70	108.40	0.79	46.40	23.07	683.03	66.97	30.93	1320.20	56.30	23.13	825.47	942.90	20408.95
OD490	56.67	20.43	118.73	0.78	62.13	39.47	1556.13	75.33	38.80	1856.97	65.33	32.17	1343.97	1585.70	32350.00
ODT92	54.67	22.40	122.20	0.69	57.03	22.20	802.47	76.83	37.73	1838.00	73.37	31.67	1476.60	1372.37	30652.76
ODT1	55.33	23.40	111.80	0.81	52.43	27.57	919.67	68.70	32.63	1425.23	56.13	23.00	820.43	1055.20	24698.28
ODT100	56.00	23.57	119.67	0.70	47.30	20.00	602.47	67.63	30.40	1306.03	71.87	24.90	1137.27	1015.27	23894.27
OD313	56.33	22.43	104.93	0.77	46.57	23.53	694.17	63.30	29.53	1187.10	55.20	22.53	786.70	889.33	20126.96
ODT19	53.67	21.93	115.03	0.79	54.53	25.67	893.63	73.67	36.77	1725.40	72.33	31.40	1449.60	1356.20	29841.47
ODT8	55.67	22.87	110.47	0.79	45.23	18.27	523.27	68.83	33.17	1448.43	58.90	23.60	884.27	952.00	21625.42
ODT82	57.00	24.77	124.27	0.76	48.00	19.53	603.30	70.07	26.93	1203.87	71.67	27.97	1281.70	1029.63	25502.56
Statistics															
F-Value (Reps)	*	nb	*	nb	*	nb	nb	nb	nb	nb	nb	nb	nb	**	**
F-Value (Gen)	nb	**	**	nb	**	**	**	*	**	**	**	**	**	**	**
LSD Gen (0.05)	4.46	1.76	7.53	0.36	11.59	17.03	432.25	11.51	8.58	567.47	15.01	9.73	631.75	474.96	11868.09
LSD Gen (0.05)	5.43	2.14	9.15	0.43	14.09	20.70	525.55	14.00	10.43	689.95	18.25	11.83	768.11	577.48	14429.84
C.V.	3.14%	3.06%	2.57%	18.84%	8.61%	25.71%	18.29%	6.34%	10.04%	14.58%	9.10%	13.83%	21.54%	15.51%	17.28%

DTPM Days to physiological maturity
 2LW Second leaf width
 18LL Eighteenth leaf length
 NLP Number of leaves per plant

2LA Second leaf area
 18LW Eighteenth leaf width
 PHT Plant height at topping
 10LL Tenth leaf length

18LA Eighteenth leaf area
 FV/FM Chlorophyll a fluorescence
 10LW Tenth leaf width
 SLA Single leaf area

2LL Second leaf length
 10LA Tenth leaf area
 WPLA Whole plant leaf area

Appendix 3: An evaluation card used by the representatives of the tobacco industry in the field evaluation of the elite breeding lines at the ARC-TCRI.

FLUE-CURED TOBACCO ELITE BREEDING LINES TRIAL: 1998/1999					
ENTRY CODE	SCORE				
	1	2	3	4	5
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
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29					
30					
31					
32					
33					
34					
35					
36					

Appendix 4:

Computer tabulated raw data of yields (kg/ha), quality components (leaf colours) and income (Rands/ha) of the elite breeding lines at the ARC-TCRI in the 1998/1999 season

PLOT	BLOC	REP	ENTRY	Marketable	Market	Average	Total	Total	Throwaway	Quality components						
				yield	income	price	yield	income		mass	M	O	J	L	Z	X
1	1	1	4	2059.67	33172.18	1610.56	2489.67	40097.59	17.27	0.00	0.00	0.00	41.93	7.87	39.99	10.21
2	1	1	11	941.67	15761.79	1673.82	1274.67	21335.60	26.12	0.00	0.00	0.00	60.85	0.00	39.15	0.00
3	1	1	2	2890.67	42459.37	1468.84	3372.00	49529.40	14.27	0.00	0.00	28.86	34.27	0.00	36.87	0.00
4	1	1	8	2192.67	37630.70	1716.21	2487.67	42693.51	11.86	0.00	0.00	0.00	56.90	0.00	43.10	0.00
5	1	1	3	3037.33	50047.14	1647.73	3253.33	53606.24	6.64	0.00	0.00	0.00	68.91	1.70	25.90	3.49
6	1	1	6	2742.67	50338.09	1835.37	3105.33	56994.36	11.68	0.00	0.00	0.00	68.52	0.89	30.59	0.00
7	1	1	5	3310.33	59876.34	1808.77	3461.33	62607.59	4.36	0.00	0.00	0.00	59.62	0.00	40.38	0.00
8	1	1	7	3134.00	53897.61	1719.77	3330.33	57274.09	5.90	0.00	0.00	0.00	57.89	0.00	42.11	0.00
9	1	1	9	2951.33	50650.71	1716.20	3305.67	56731.78	10.72	0.00	0.00	9.66	69.58	4.42	16.34	0.00
10	1	1	1	2987.33	49537.68	1658.26	3357.33	55673.23	11.02	0.00	0.00	15.88	63.88	0.00	20.24	0.00
11	1	1	10	2866.67	49540.62	1728.16	3373.33	58296.64	15.02	0.00	0.00	0.00	48.34	0.00	51.66	0.00
12	1	1	12	3904.33	73238.93	1875.84	4109.33	77084.39	4.99	0.00	0.00	3.37	71.68	0.00	23.44	1.50
13	1	2	3	2465.00	40311.53	1635.36	2831.67	46307.84	12.95	0.00	0.00	3.31	61.92	7.38	25.40	1.99
14	1	2	5	3016.00	51630.76	1711.90	3338.43	57150.48	9.66	0.00	0.00	1.44	66.78	7.96	23.83	0.00
15	1	2	8	2900.00	50905.38	1755.36	3211.33	56370.39	9.69	0.00	0.00	6.75	62.16	0.00	15.82	15.28
16	1	2	9	2751.67	48321.51	1756.08	3152.00	55351.70	12.70	0.00	0.00	0.00	61.30	0.00	38.70	0.00
17	1	2	1	3771.33	67596.32	1792.37	3988.33	71485.77	5.44	0.00	0.00	0.00	61.06	0.00	38.29	0.65
18	1	2	10	2662.33	41865.64	1572.52	3229.67	50787.06	17.57	0.00	0.00	7.79	66.31	0.00	25.90	0.00
19	1	2	7	2117.33	36863.23	1741.02	2218.00	38615.86	4.54	0.00	0.00	6.66	70.72	2.74	19.88	0.00
20	1	2	6	3169.67	54543.37	1720.79	3424.33	58925.65	7.44	0.00	0.00	0.00	54.83	1.63	43.54	0.00
21	1	2	12	3250.67	58889.10	1811.60	3483.67	63110.13	6.69	0.00	0.00	0.00	76.68	0.00	23.32	0.00
22	1	2	11	2605.00	45985.33	1765.27	3124.33	55152.98	16.62	0.00	0.00	0.00	77.49	0.00	22.51	0.00
23	1	2	4	2740.33	42557.83	1553.02	2942.67	45700.10	6.88	0.00	0.00	0.00	51.06	9.22	37.25	2.47
24	1	2	2	3802.67	65034.46	1710.23	4139.67	70797.95	8.14	0.00	2.55	0.44	46.93	1.94	48.14	0.00
25	1	3	9	2786.67	45232.54	1623.18	3049.00	49490.68	8.60	0.00	0.00	0.00	55.48	1.77	41.93	0.83
26	1	3	6	3400.00	55707.96	1638.47	3623.00	59361.75	6.16	0.00	0.00	0.00	54.85	4.95	40.20	0.00
27	1	3	4	3200.67	49771.92	1555.05	3526.33	54836.19	9.24	0.00	0.00	0.00	50.91	4.22	44.88	0.00
28	1	3	11	2772.00	45823.74	1653.09	3089.00	51064.05	10.26	0.00	0.00	0.00	52.73	4.34	42.03	0.90
29	1	3	3	2554.67	36123.39	1414.02	2934.00	41487.22	12.93	0.00	0.00	0.00	55.01	7.99	34.50	2.51
30	1	3	5	2851.67	49186.05	1724.82	3066.00	52882.91	6.99	0.00	0.00	0.00	80.60	3.10	15.44	0.86
31	1	3	2	3156.33	48567.76	1538.74	3617.67	55666.48	12.75	0.00	0.00	3.88	63.52	11.11	21.49	0.00
32	1	3	12	3651.33	57752.47	1581.68	3915.33	61928.11	6.74	0.00	0.00	1.20	66.82	3.97	28.02	0.00
33	1	3	7	2757.67	34882.07	1264.91	3195.33	40418.17	13.70	0.00	0.00	3.19	32.13	16.95	47.73	0.00
34	1	3	8	2686.67	40004.95	1489.02	3517.33	52373.73	23.62	0.00	0.00	0.00	52.25	8.11	37.77	1.87
35	1	3	1	3221.00	53950.54	1674.96	4045.00	67752.23	20.37	0.00	0.00	2.39	77.40	4.76	15.45	0.00
36	1	3	10	2819.67	36242.30	1285.34	3607.00	46362.21	21.83	0.00	0.00	0.00	33.15	29.80	37.05	0.00

O : Orange; J : Light orange; L : Lemon; Z : Closed grain or sponge; X : Bottom leaf; AF : Leaf broken to fine mass
 Throwaway mass expressed as percentage of the total yield.

Appendix 5: Analysis of variance of the yields (kg/ha), quality components (leaf colours), grade indices (average prices in cents/kg) and income (Rands/ha) of the elite breeding lines at the ARC-TCRI in the 1998/1999 season

PLOT	ENTRY	Marketable yield	Market income	Average price	Total yield	Total income	Throwaway mass	Quality components					
								O	J	L	Z	X	AF
1	OD 1	3326.56	57028.18	1708.53	3796.89	64970.41	12.28	0.00	6.09	67.45	1.59	24.66	0.22
2	OD 2	3283.22	52020.53	1572.61	3709.78	58664.61	11.72	0.85	11.06	48.24	4.35	35.50	0.00
3	OD 486B	2685.67	42160.68	1565.70	3006.33	47133.76	10.84	0.00	1.10	61.95	5.69	28.60	2.66
4	TL 33	2666.89	41833.98	1572.88	2986.22	46877.96	11.13	0.00	0.00	47.97	7.10	40.70	4.23
5	OD 490	3059.33	53564.39	1748.49	3288.59	57546.99	7.00	0.00	0.48	69.00	3.69	26.55	0.29
6	ODT 92	3104.11	53529.81	1731.54	3384.22	58427.26	8.42	0.00	0.00	59.40	2.49	38.11	0.00
7	ODT 1	2669.67	41880.97	1575.23	2914.56	45436.04	8.04	0.00	3.28	53.58	6.56	36.58	0.00
8	ODT 100	2593.11	42847.01	1653.53	3072.11	50479.21	15.06	0.00	2.25	57.10	2.70	32.23	5.72
9	OD 313	2829.89	48068.26	1698.49	3168.89	53858.05	10.67	0.00	3.22	62.12	2.06	32.32	0.28
10	ODT 19	2782.89	42549.52	1528.67	3403.33	51815.30	18.14	0.00	2.60	49.26	9.93	38.21	0.00
11	ODT 8	2106.22	35856.95	1697.39	2496.00	42517.54	17.67	0.00	0.00	63.69	1.45	34.56	0.30
12	ODT 82	3602.11	63293.50	1756.37	3836.11	67374.21	6.14	0.00	1.52	71.73	1.32	24.93	0.50
Statistics													
F-value (Reps)		NS	NS	**	NS	NS	NS	NS	NS	NS	**	NS	NS
F-value (Entry)		*	*	NS	*	*	NS	NS	NS	NS	NS	NS	NS
LSD Entry (0.05)		1173.65	23213.99	255.29	1156.96	22858.16	12.40	1.08	14.38	27.86	13.83	28.92	7.53
LSD Entry (0.01)		1426.98	28224.78	310.39	1406.69	27792.15	15.08	1.32	17.49	33.88	16.81	35.16	9.16
C.V.		15.93%	19.04%	6.07%	13.96%	16.70%	42.62%	600.00%	214.46%	18.45%	133.15%	34.68%	250.15%

O : Orange; J : Light orange; L : Lemon; Z : Closed grain or sponge; X : Bottom leaf; AF : Leaf broken to fine mass
 Throwaway mass expressed as percentage of the total yield.

Appendix 6: Computer tabulated raw data of the concentration of nicotine and reducing sugars of the leaves of the elite breeding lines at the ARC-TCRI in the 1998/1999 season.

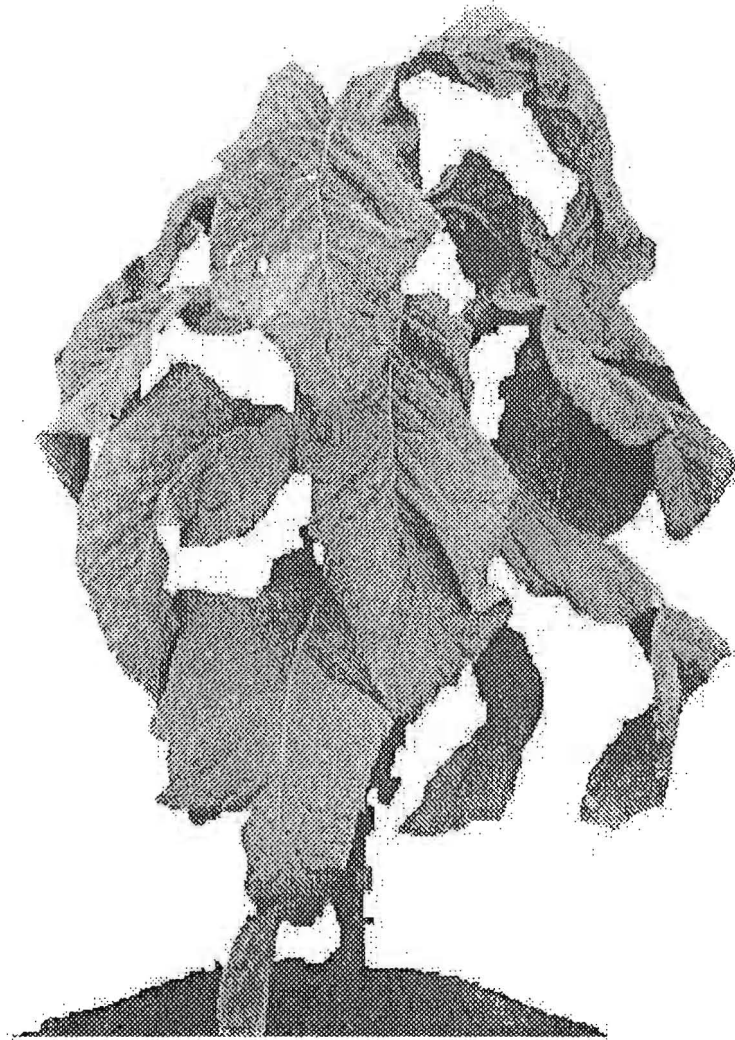
Plot	Block	Rep.	Entry	% Nicotine	% Reducing sugars
1	1	1	4	3.94	22.86
2	1	1	11	2.58	18.28
3	1	1	2	2.74	21.20
4	1	1	8	3.42	23.54
5	1	1	3	2.31	21.93
6	1	1	6	2.63	19.84
7	1	1	5	3.44	31.54
8	1	1	7	3.57	21.61
9	1	1	9	3.52	23.90
10	1	1	1	2.55	20.06
11	1	1	10	4.07	21.09
12	1	1	12	2.39	22.32
13	1	2	3	2.42	17.21
14	1	2	5	2.62	25.23
15	1	2	8	2.58	20.23
16	1	2	9	2.81	30.93
17	1	2	1	2.96	26.02
18	1	2	10	2.76	17.32
19	1	2	7	2.79	22.98
20	1	2	6	2.62	19.43
21	1	2	12	2.46	19.19
22	1	2	11	2.67	16.14
23	1	2	4	2.96	21.02
24	1	2	2	2.79	25.73
25	1	3	9	2.80	27.11
26	1	3	6	1.99	21.57
27	1	3	4	2.90	21.39
28	1	3	11	2.46	18.70
29	1	3	3	2.83	27.72
30	1	3	5	2.94	29.64
31	1	3	2	2.73	21.10
32	1	3	12	3.09	20.81
33	1	3	7	3.51	14.56
34	1	3	8	4.08	19.20
35	1	3	1	2.91	21.23
36	1	3	10	3.27	20.24

Appendix 7: Analysis of variance of the concentration of nicotine and reducing sugars in the leaves of the elite breeding lines at the ARC-TCRI in the 1998/1999 season.

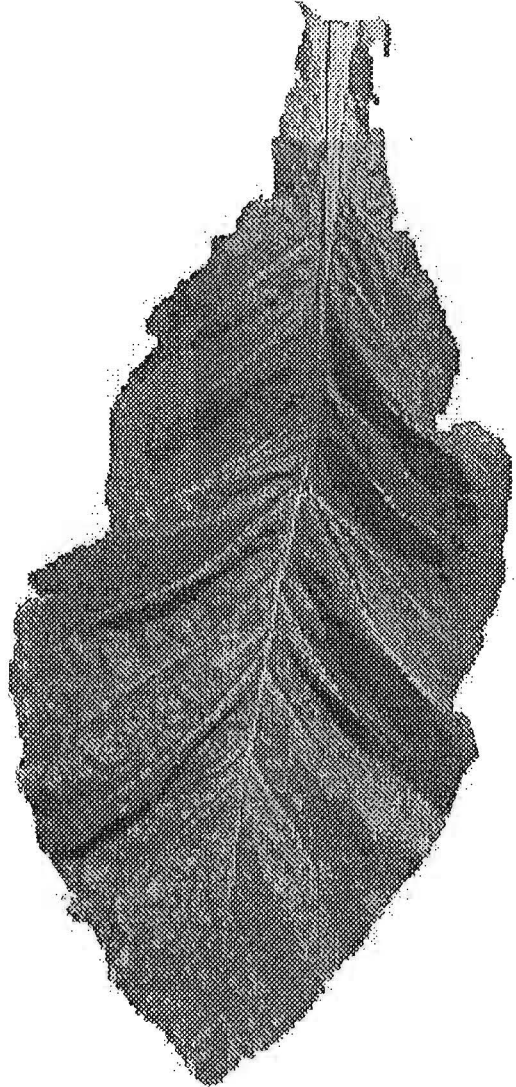
Entry	% Nicotine	% Reducing sugars
OD1	2.81	22.44
OD2	2.75	22.68
OD486B	2.52	22.29
TL33	3.27	21.76
OD490	3.00	28.80
ODT92	2.41	20.28
ODT1	3.29	19.72
ODT100	3.36	20.99
OD313	3.04	27.31
ODT19	3.37	19.55
ODT8	2.57	17.71
ODT82	2.65	20.77
Statistics		
F-value (Reps)	NS	NS
F-value (Entry)	NS	**
LSD Entry (0.05)	1.03	7.78
LSD Entry (0.01)	1.26	9.45
C.V. (%)	13.91	13.86

Appendix 8: Pictorial characteristic features of the ripe leaves of TL33 and the breeding lines; ODT82, ODT92 and OD2 as observed at the ARC-TCRI in the 1998/1999 season

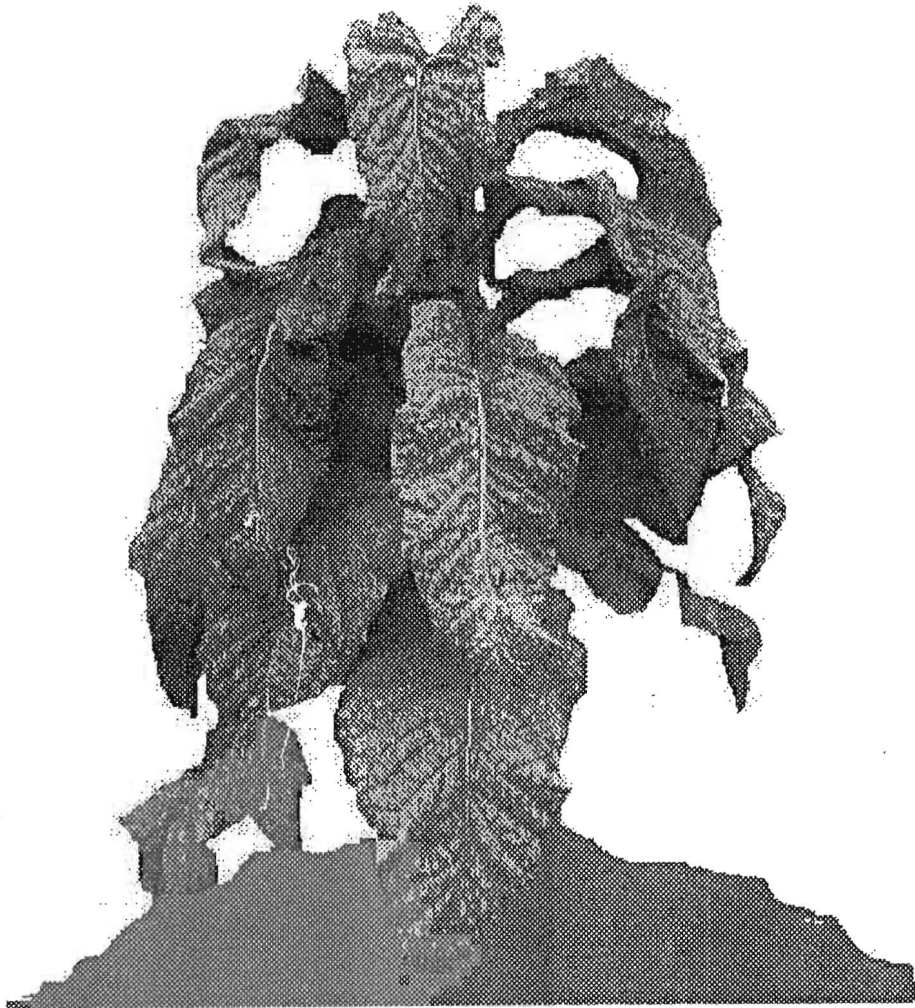
TL33



TL33

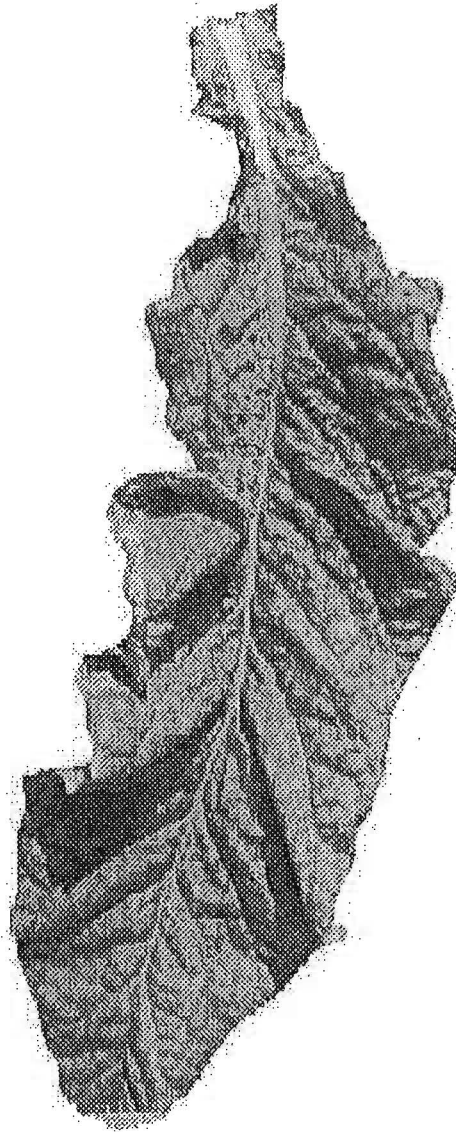


ODT82





ODT82

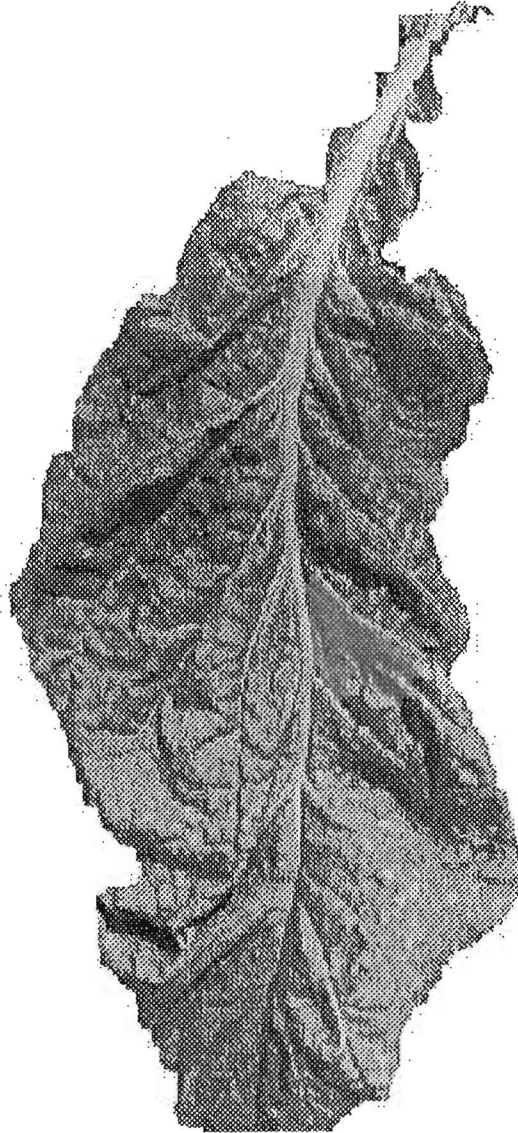


ODT92

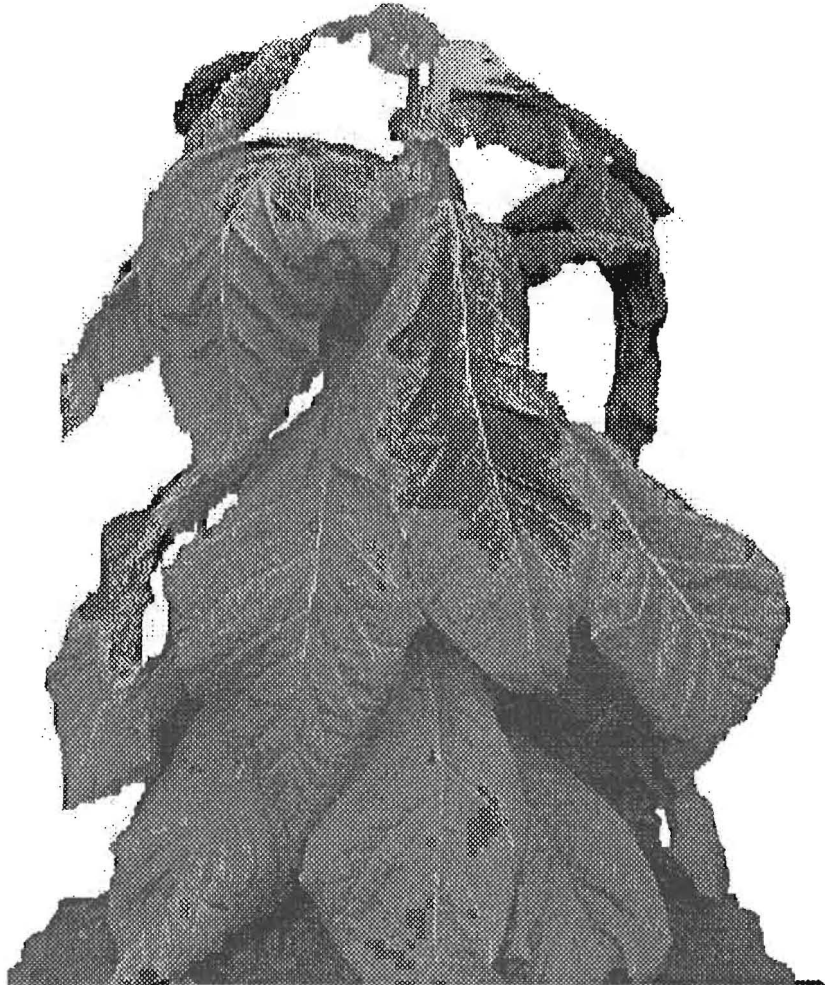




ODT92



OD2



OD2

