

# C A M C O R E

## ANOVA AND MULTIPLE COMPARISONS FOR PROVENANCE AND FAMILY VOLUME

### FIVE YEAR MEASUREMENTS

TEST IDENTIFICATION: 13-06-11D  
SPECIES: Pinus tecunumanii - High elevation  
COMPANY: EMBRAPA  
SITE NAME: Felixandia  
LATITUDE: 18° 45' S  
LONGITUDE: 44° 53' W  
ELEVATION: 614 m  
ANNUAL PRECIPITATION: 1220 mm  
  
DATE PLANTED: December 1984  
DATE MEASURED: December 1989

### ANALYSIS OF VARIANCE

DEPENDENT VARIABLE: Five Year Volume (cubic meters)

<u>SOURCE</u>	<u>DF</u>	<u>SUM OF SQUARES</u>	<u>F</u> <u>VALUE</u>
REP	8	0.00928262	2.48 *
PROV	10	0.04344996	9.29 **
REP*PROV	79	0.03692934	1.07 ns
FAM(PROV)	30	0.04333640	3.30 **
REP*FAM(PROV)	240	0.10511500	1.29 **
ERROR	1488	0.50356938	
<hr/>			
CORRECTED TOTAL	1855	0.74576385	

ns: Not significant

\* Significant at  $p < .05$   
\*\* Significant at  $p < .01$

TEST MEAN  
0.03167 m<sup>3</sup>

C.V. (%)  
58.08  
136

## \*\*\*\*\* MEANS BY PROVENANCE \*\*\*\*\*

## WALLER-DUNCAN MULTIPLE COMPARISONS FOR FIVE YEAR PROVENANCE VOLUME

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

<u>Waller</u>	<u>Grouping</u>	<u>Mean</u>	<u>N</u>	<u>Provenance</u>
	A	0.04589	47	* Control 405
	A			
B	A	0.04139	44	* Control 200
B				
B	C	0.03824	276	San Jeronimo
B	C			
B	C	0.03579	232	Las Trancas
	C			
E	C	0.03207	185	Celaque
E				
E		0.03002	314	San Lorenzo
E				
E		0.02984	142	La Soledad
E				
E		0.02882	75	KM47
E				
E		0.02825	41	KM33
E				
E		0.02673	454	San Vicente
	F	0.01967	46	* Control 206

\* Control lots: 200 = Pinus tecunumanii, San Jeronimo, Guatemala  
 206 = Pinus oocarpa, Agudos, Brazil  
 405 = Pinus oocarpa, Commercial control, CAFMA

## \*\*\*\*\* MEANS BY FAMILY \*\*\*\*\*

<u>Fam</u>	<u>Prov</u>	<u># Trees</u>	<u>% Surv</u>	<u>Mean Height (m)</u>	<u>C.V. (%)</u>	<u>Mean D.B.H. (cm)</u>	<u>Tree Volume (cubic m)</u>
31	5	52	96.30	9.0	14.74	12.8	0.04781
15	5	50	92.59	9.0	15.78	12.4	0.04596
405	*	47	87.04	9.3	18.85	12.2	0.04589
200	*	44	81.48	8.8	15.63	12.0	0.04139
233	9	38	70.37	8.3	29.18	11.5	0.04125
210	9	48	88.89	8.5	15.15	11.9	0.03987
30	5	44	81.48	9.1	11.59	11.7	0.03959
77	6	46	85.19	8.5	24.36	11.1	0.03851
263	8	50	92.59	8.5	22.92	11.4	0.03823
37	5	44	81.48	9.0	22.91	10.7	0.03638
283	8	44	81.48	8.6	19.46	10.9	0.03415
181	2	43	79.63	8.3	25.51	10.9	0.03393
136	3	49	90.74	8.1	21.76	10.8	0.03373
3	6	37	68.52	8.3	21.35	10.6	0.03341
252	9	48	88.89	8.4	20.47	10.9	0.03328
226	9	49	90.74	8.0	18.63	10.8	0.03298
217	9	49	90.74	8.3	15.33	11.0	0.03280
91	7	48	88.89	7.8	19.54	10.7	0.03194
18	5	40	74.07	8.3	27.02	10.1	0.03144
12	6	52	96.30	8.1	20.67	10.6	0.03125
189	7	44	81.48	8.2	21.71	10.4	0.03098
47	6	44	81.48	8.4	16.11	10.6	0.03090
275	8	46	85.19	8.4	15.30	10.6	0.03042
90	7	48	88.89	8.0	16.70	10.6	0.03016
144	3	43	79.63	7.9	20.89	10.3	0.02932
44	6	43	79.63	7.5	24.72	10.2	0.02886
169	1	41	75.93	7.7	21.72	10.3	0.02825
85	7	39	72.22	7.8	21.04	10.4	0.02804
82	7	43	79.63	7.7	21.31	10.2	0.02743
146	3	50	92.59	7.5	21.54	10.1	0.02647
87	7	47	87.04	7.9	21.56	9.6	0.02541
903	5	46	85.19	8.1	22.37	9.3	0.02540
267	8	45	83.33	8.2	19.84	9.4	0.02488
92	7	41	75.93	7.7	26.24	9.3	0.02452
135	6	43	79.63	6.9	28.02	9.7	0.02415
83	7	48	88.89	7.2	19.62	9.8	0.02394
72	6	49	90.74	7.3	25.47	9.5	0.02353

## \*\*\*\*\* MEANS BY FAMILY \*\*\*\*\*

<u>Fam</u>	<u>Prov</u>	<u># Trees</u>	<u>% Surv</u>	<u>Mean Height (m)</u>	<u>C.V. (%)</u>	<u>Mean D.B.H. (cm)</u>	<u>Tree Volume (cubic m)</u>
123	7	48	88.89	7.6	18.99	9.7	0.02338
178	2	32	59.26	7.0	27.89	9.1	0.02196
89	7	48	88.89	7.8	21.70	9.0	0.02177
206	*	46	85.19	7.3	21.12	9.0	0.01967

---

OVERALL		1719	83.77	8.1	21.78	10.5	0.03136
---------	--	------	-------	-----	-------	------	---------

---

Note: Tree volume with bark was calculated using a formula for juvenile trees: Volume (cubic meters) =  $0.0003 \cdot D^2 \cdot H$ , where D=DBH in centimeters and H = total height in meters.  
The overall values do not include control lots.

Provenance code: 1 = KM33, Guatemala  
2 = KM47, Guatemala  
3 = La Soledad, Guatemala  
5 = San Jeronimo, Guatemala  
6 = San Lorenzo, Guatemala  
7 = San Vicente, Guatemala  
8 = Celaque, Honduras  
9 = Las Trancas, Honduras