



... root intervals in the rows.

40 crosses are represented by 21 seedling families. 10 clones were used; they are PB-186, Av.49, Av.186, and F-2113. The table below illustrates the number of individual seedlings of each family, and the number of trees to the various families.

Classes of Resistance to Dothidella							N. of Trees	Sporulat	
3	4	5	6	7	8	9/10		Lgt.	Med.
-	1	19	21	2	-	-	43	5	9
-	-	4	13	10	-	-	27	4	5

10	9	1	-	-	21
43	35	5	-	-	114
20	12	11	5	3	71
-	-	3	1	-	4
6	3	-	-	-	17

CPAA-14065-1

1940

A classification of the ...

FL-F010829





abril 8-13, 1943  
1940

M. A. — C. N. E. P. A. — I. EXP. A. — INSTITUTO AGRONOMICO DO NORTE

A Classification of the Seedlings from the 1940 Crosses,  
For their Resistance to South American Leaf Disease, Do-  
thidella ulei; and Black Crust, Catacauma Huberi.

The 1002 seedlings representing the 1940 crosses made on the Fordlandia and Belterra estates of the Ford rubber plantations, were examined on April 8 and 13, 1943 to classify their individual resistance to South American Leaf Disease (*Dothidella ulei*) and to Black Crust (*Catacauma Huberi*). These seedlings are planted in block 122, plots A and B, on Belterra estate. The rows of seedlings are approximately 14 feet apart and the seedlings are spaced at 2½ foot intervals in the rows.

These 1940 crosses are represented by 21 seedling families. Six Oriental clones were used; they are PB-186, Av.49, Av.183, GL-1, Pilm-D-65, and F-2113. The table below illustrates the classification of the individual seedlings of each family, and the relative resistance to the various families.

Seedling Family	Classes of Resistance to <i>Dothidella</i>									N. of Trees	Sporulation			Catac. Huberi		
	2	3	4	5	6	7	8	9/10	Lgt.		Med.	Hvy	Lgt.	Med.	Hvy.	
F-1693xAv49	-	-	1	19	21	2	-	-	43	5	9	1	4	10	5	
Av.183xF397	-	-	-	4	13	10	-	-	27	4	5	9	7	11	5	
F-1168xAv49	-	-	3	9	3	-	-	1	16	4	2	1	3	5	2	
F-1395xAv49	-	-	-	7	9	4	1	-	21	3	6	2	11	5	-	
F-328xAv49	-	-	-	2	5	-	1	-	8	1	1	3	3	2	1	
F-351xAv49	-	-	15	65	126	27	3	11	247	37	75	83	45	42	17	
F-315xPB186	-	1	46	44	26	21	4	1	143	15	15	14	23	28	17	
F-176xPB186	-	-	8	36	45	16	3	2	110	18	24	45	31	28	16	
Av183xF4537	-	1	1	6	23	13	2	2	48	4	10	23	10	11	12	
F-269xF193	-	-	5	18	13	13	-	-	49	5	10	13	11	11	2	
F-173xPB186	-	-	-	5	11	1	-	-	17	5	5	2	2	5	5	
F-170xGL-1	-	-	1	10	9	1	-	-	21	5	4	3	1	3	1	
F-171xPB186	-	1	30	43	35	5	-	-	114	17	22	18	27	26	11	
F-316xPB186	-	-	20	20	12	11	5	3	71	2	7	25	18	6	4	
F-1625xAv183	-	-	-	-	-	3	1	-	4	-	1	3	1	2	1	
F-4537xAv49	-	-	8	6	3	-	-	-	17	3	4	6	3	-	-	
F-4537xPB186	-	2	11	5	2	1	-	-	21	3	10	3	3	1	-	
F-4542xAv183	-	-	2	3	-	-	-	-	5	1	1	-	-	-	-	
F-283xPillD65	-	-	1	2	1	-	-	-	4	1	1	1	-	-	1	
F1655xPillD65	-	-	-	-	1	-	-	-	1	-	1	-	-	1	-	
F6520xF2113	-	-	-	-	8	7	-	-	15	-	3	12	7	6	-	
Apr. 43 Totals	-	5	152	304	366	135	20	20	1002	133	216	267	210	203	110	
Dec. 42 Totals	1	19	180	391	332	21	11	44	1004	78	173	157	191	68	4	



-2-

From the above table it will be noted that no seedlings are rated in Class 2. There are 5 seedlings in Class 3, 152 in Class 4, and 304 in Class 5. A total of 461 seedlings or 46.0% of them rate Class 5 or better, and 157 seedlings or 15.6% rate Class 4 or better under natural field conditions of inoculation.

When comparing the present classifications with those made in December 1942, one notes the great decrease in the number of seedlings in the first five categories. In December, 58.8% of the seedlings rated Class 5 or better but now only 46.0% of them fall in those classes. Only 15.6% of the seedlings rate Class 4 or better now as compared with 19.9% in December. At the present time 61.47% of the seedlings show some sporulation; 26.6% of them having heavy sporulation. In December only 40.63% of the seedlings were found to be sporulating; 15.6% of them heavily.

The incidence of attacks by *Catacauma Huberi* has increased enormously among the seedlings since last December. Then only 26.19% of the trees suffered attacks of Black Crust, and these were mostly light to moderate infections. At the present time 51.20% of the seedlings have suffered attacks by Black Crust. More than half of them ranging from moderate to heavy infections.

In the following table are presented the eight families which have given the highest percentages of seedlings resistant to SALD. The table gives the percentage of seedlings in each family which fall in each of the first five resistance categories. The most outstanding resistant families are those with the Benthamiana clones F-4537 and F-4542. The three best families, F-4542 x Av.183, F-4537 x PB-186, and F-4537 x Av.49; are combinations with these two clones. The families of F-4537 x PB-186 and F-4537 x Av.49 have the highest percentages of seedlings in Classes 3-4.

Seedling Family	Resistance Class					Percentage Total Classes 1-5
	1	2	3	4	5	
F-4542xAv183	-	-	-	40.0%	60.0%	100.0%
F-4537xPB186	-	-	9.5%	52.4	23.8	85.7
F-4537xAv49	-	-	-	47.0	35.3	82.3
F-1168xAv49	-	-	-	18.7	56.2	74.9
F-171xPB186	-	-	.9	26.3	37.7	64.9
F-315xPB186	-	-	.7	32.2	30.7	63.6
F-316xPB186	-	-	-	28.2	28.2	56.4
F-170xGL-1	-	-	-	4.8	47.6	52.4

As stated previously, sporulation is heavy by South American Leaf Disease among the seedlings of the 1940 crosses: 61.47% of them



-3-

are sporulating to some extent. Among the families which have the highest percentages of seedlings resistant to the disease, the crosses of F-315 x PB-186, F-4542 x Av.183, F-1168 x Av.49, and F-316 x PB-186 have the lowest rates of sporulation. In the case of F-4542 x Av.183 and F-1168 x Av.49, most of the sporulation is sparse to moderate, while the seedlings of F-315 x PB-186 are about equally represented in all three classes of sporulation. F-316 x PB-186, on the other hand, has most of its seedlings which sporulate, with heavy sporulation.

It is interesting to note that of the three Benthamiana crosses, the seedlings of F-4542 x Av.183 show no heavy sporulation, while the crosses of F-4537 x PB-186 and F-4537 x Av.49 exhibit heavy or moderate sporulation by many of their seedlings. However, the heavy sporulation by SALD on the thick leaves of the Benthamiana crosses does not appear to cause extensive necrotic lesions and damage usually found on crosses between Brasiliensis clones. The leaves often are little effected by the disease even though sporulation occurs.

The following table classifies the eight seedling families giving the highest percentages of resistant seedlings, to show the comparative amounts of sporulation among the seedlings of each cross.

Seedling Family	Sporulation by SALD			Percentage Total Trees Sporulating.
	Light	Medium	Heavy	
F-4542xAv.183	20.0%	20.0%	---	40.0%
F-4537xPb-186	14.3	47.6	14.3%	76.2
F-4537xAv.49	17.6	23.5	35.3	76.4
F-1168xAv.49	25.0	12.5	6.2	43.7
F-171xPB-186	14.9	19.3	15.8	50.0
F-315xPB-186	10.5	10.5	9.8	30.8
F-316xPB-186	2.8	9.8	35.2	47.8
F-170xGL-1	23.8	19.0	14.3	57.1

Although 51.20% of all of the seedlings from the 1940 crosses have been attacked by Black Crust (*Catacauma Huberi*), there are some striking examples of resistance to the attacks of this fungus. This is especially true of the three Benthamiana crosses: F-4542 x Av.183, F-4537 x Av.49, and F-4537 x PB-186. None of the five seedlings of the cross F-4542 x Av.183 show any signs of attack by Black Crust. The combinations of F-4537 x Av.49 and F-4537 x PB-186 show only 17.6% and 19.0% of their seedlings respectively, suffering attacks of this fungus; and for the most part the infections are very light.



-4-

The crosses of F-170 x GL-1 and F-316 x PB-186 also have fairly low percentages of their seedlings suffering heavy attacks by *Catacauma Huberi*.

The following table illustrates the percentage of infection by Black Crust among the eight seedling families giving the highest percentages of seedlings resistant to SALD.

Seedling Family	Catacauma Huberi			Percentage Total Trees Infected
	Light	Medium	Heavy	
F-4542xAv.183	---	---	---	---
F-4537xPB-186	14.3%	4.7%	---	19.0%
F-4537xAv.49	17.6	---	---	17.6
F-1168xAv.49	18.7	31.2	12.5%	62.4
F-171xPB-186	23.6	22.8	9.6	56.0
F-315xPB-186	16.1	19.6	11.9	47.6
F-316xPB-186	25.3	8.4	5.6	39.3
F-170xGL-1	4.7	14.3	4.7	23.7

In the following table is presented a summary of the three previous tables classifying eight of the seedling families from the 1940 crosses for their resistance to SALD, sporulation by SALD, and incidence of *Catacauma Huberi*. Although all of the eight families have more than 50.0% of their seedlings falling into resistance classes 1-5, there are seedlings in most of the families which are poor in their resistance to SALD and *Catacauma*.

The best seedling family among the 1940 crosses is F-4542 x Av.183. All of the seedlings in this family fall into classes 4-5 for resistance to SALD. None of these seedlings have been attacked by *Catacauma Huberi*, and sporulation by SALD is sparse to moderate on those seedlings where sporulation occurs.

The Benthamiana crosses of F-4537 x Av.49 and F-4537 x PB-186 have very high percentages of seedlings resistant to SALD, but the percentage of sporulation by the disease among the seedlings is high in spite of the slight damage caused to the leaves by the disease. These two families are but lightly attacked by *Catacauma*. Apparently material multiplied from seedlings of these two families could withstand heavy attacks of SALD in spite of their heavy sporulation. However, it would be inadvisable to use such material for planting or for top-budding because of the heavy disease inoculum they would supply to surrounding plantings.

The families of F-1168 x Av.49 and F-315 x PB-186 have many



seedlings resistant to SALD. Sporulation by Dothidella and infection by Catacauma are moderate.

The crosses of F-170 x GL-1 and F-316 x PB-186 exhibit good resistance to infection by Black Crust but the sporulation by SALD is fairly heavy among the seedlings.

Seedling Family	Seedlings in Classes 1-5 for Resistance to SALD	Seedlings Sporulating with SALD	Seedlings Attacked by Catacauma Huberi
F-4542 x Av183	<u>100.0%</u>	<u>40.0%</u>	----
F-4537 x PB186	<u>85.7</u>	<u>76.2</u>	<u>19.0%</u>
F-4537 x Av49	<u>82.3</u>	76.4	<u>17.6</u>
F-1168 x Av49	<u>74.9</u>	43.7	<u>62.4</u>
F-171 x PB186	<u>64.9</u>	50.0	56.0
F-315 x PB186	63.6	<u>30.8</u>	47.6
F-316 x PB186	56.4	<u>47.8</u>	39.3
F-170 x GL-1	52.4	57.1	23.7

a) L. Beery Jr.  
4/26/43



A CLASSIFICATION OF THE SEEDLING  
1940 CROSSES PLANTED IN BLOCK 122, BELTERRA

Seedling Family	Classes of Resistance to <i>Dothidella ulei</i>										Total No. of Trees	SPORULATION				CATALOGUE	L...
	1	2	3	4	5	6	7	8	9	10		Sparse	Light	Heavy	Sparse		
F1693XAV49			1	4	20	15	-	-	2	-	42	2	3	2	7	5	
AV183XF397			1	7	8	10	1	-	2	-	27	4	2	2	10	1	
F1168XAV49			1	5	5	3	1	-	2	-	16	1	2	1	6	2	
F1395XAV49			1	4	8	6	1	1	-	-	21	1	-	1	5	3	
F328XAV49			1	1	4	3	-	-	-	-	8	2	-	2	2	-	
F351XAV49		1	1	23	102	95	-	1	19	-	242	21	49	58	36	13	
F315XPB186			10	60	49	18	2	2	3	-	145	7	11	3	32	6	
F176XPB186			2	21	40	41	4	-	6	-	114	17	27	22	24	12	
AV183XF4537				5	20	19	1	1	3	-	48	8	8	8	6	4	
F269XF193				7	22	17	-	1	1	-	49	1	12	12	11	7	
F173XPB186					4	12	-	1	2	-	17	4	2	1	3	4	
F170XGL-1					7	12	-	1	2	-	21	4	9	1	1	2	
F171XPB186			1	25	51	28	-	2	2	-	115	4	25	1	24	7	
F316XPB186				4	29	30	3	3	1	-	70	3	7	23	20	2	
F1625XAV183					3	1	-	-	1	-	4	1	3	1	1	1	
F4537XAV49				3	4	4	-	-	-	-	17	1	4	1	1	1	
F4537XPB186				9	8	4	-	-	-	-	21	1	5	-	1	1	
F4542XAV183			2	2	2	1	-	-	-	-	7	-	3	-	1	1	
F283XP11D65					1	3	-	-	-	-	4	-	-	-	-	-	
F1655X "					1	1	-	-	-	-	1	-	-	-	-	-	
F6520XF2113					4	8	-	-	3	-	15	1	2	-	-	-	

Examined Dec. 11, 12, 14, 1942.