21 seedlings. Six of the families are repres
than five trees. They are: F-1655 x Av.49 (1
86 (1), F-170 x Av.49 (2), F-1624 x Av.183 (3),
3), and F-166 x Av.49 (4). The largest seedling
F-328 x PB-186 (192), F-681 x Av.49 (177), F-351
F-707 x Av.49 (143), F-170 x PB-186 (138), and
(124).

time these seedlings were examined it was noted
ees bore a number of illegitimate seed. Many of
e large enough to bear flowers during the coming
uld be possible to use flowers from some of the
best combinations in crosses, both as a male an
parent.

25	49	35	4	5	124
2	-	7	2	-	11
17	19	19	4	1	67
6	8	5	2	-	21
47	41	55	31	3	192

3

1939

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

abril 14-28, 1943

A Classification of the Seedlings from the 1939 Crosses, For their Resistance to South American Leaf Disease, Dothidella ulei; and Black Crust, Catacauma Huberi

The 1939 hand-pollinated seedling families were examined on April 14, 15, 22, 27 and 28, 1943, to determine their resistance to South American Leaf Disease. These crosses were made at Fordlandia estate and brought to Belterra where they were planted in plots C and D of block 91 at a regular field spacing.

These 1939 crosses have 38 seedling families which are represented by 1721 seedlings. Six of the families are represented by less than five trees. They are: F-1655 x Av.49 (1), F-370 x PB-186 (1), F-170 x Av.49 (2), F-1624 x Av.183 (3), F-230 x Tj-16(3), and F-166 x Av.49 (4). The largest seedling progenies are: F-328 x PB-186 (192), F-681 x Av.49 (177), F-351 x PB-186 (164), F-707 x Av.49 (143), F-170 x PB-186 (138), and F-5566 x Av.49 (124).

At the time these seedlings were examined it was noted that a few trees bore a number of illegitimate seed. Many of the trees will be large enough to bear flowers during the coming season. It should be possible to use flowers from some of the seedlings of the best combinations in crosses, both as a male and as a female parent.

Table I

Seedling Family	Classes of Resistance to Dothidella								No. of	Sporulation			Catac. Huberi		
	2	3	4	5	6	7	8	9/10	Trees	Lgt.	Med.	Hvy.	Lgt.	Med.	Hvy.
F-315xTj-16	1	3	7	8	8	6	-	-	33	8	3	4	4	8	4
F-315xAv.49	-	2	4	8	3	1	-	-	18	3	4	4	6	4	4
F-5566xTj16	-	-	-	1	3	15	2	1	22	2	5	14	6	9	7
F-5566xAv49	-	1	5	25	49	35	4	5	124	20	37	33	13	10	15
F-269xTj-16	-	-	-	2	-	7	2	-	11	2	5	4	1	3	4
F-176xAv.49	-	-	7	17	19	19	4	1	67	9	9	22	12	19	19
F-328xAv.49	-	-	-	6	8	5	2	-	21	5	5	1	5	5	3
F-328xPB186	-	-	15	47	41	55	31	3	192	42	45	38	53	48	67
F-6416xAv49	-	-	5	3	-	4	-	-	12	4	2	3	7	1	-
F-316xAv.49	-	2	24	27	19	5	1	1	79	23	10	19	23	12	9
F-681xAv.49	-	1	3	32	53	56	29	3	177	16	47	40	20	34	25
F-171xAv.49	-	3	12	24	14	11	-	1	65	11	12	17	15	17	6
F-707xAv.49	-	3	13	31	36	55	3	2	143	24	35	26	18	28	49
F-707xPB186	-	1	8	11	5	1	-	1	27	6	9	-	7	3	3
F-1168xGL-1	-	-	12	22	14	7	-	3	58	8	20	8	11	10	15
F-406xAv.49	-	-	1	5	3	6	-	-	15	3	4	3	2	4	1
F-351xPB186	-	-	7	33	52	62	4	6	164	23	37	82	37	34	26
F-1655xAv49	-	-	-	1	-	-	-	-	1	-	1	-	1	-	-
F-1624xAv183	-	-	-	1	2	-	-	-	3	-	3	-	2	-	-

Seedling Family	Classes of Resistance to Dothidella. 2	3	4	5	6	7	8	9/10	No. of Trees	Sporulation Lgt.	Med.	Hvy.	Catac. Huberi Lgt.	Med.	Hvy.
F-1403xAv.49	-	-	-	3	3	2	-	-	8	1	4	1	1	3	1
F-1625xAv.49	-	2	1	5	6	5	-	-	19	2	2	7	6	6	4
F-1395xAv.49	-	-	1	-	3	10	1	-	15	1	-	7	-	4	7
F-1395xAv183	-	1	2	-	3	14	1	-	21	1	1	9	1	6	9
F-1693xPB186	-	-	3	5	2	4	2	-	16	4	3	2	1	1	1
F-170xAv.49	-	-	-	-	2	-	-	-	2	2	-	-	-	-	1
F-170xPB186	-	-	11	40	45	27	15	-	138	21	33	34	26	9	50
F-4542xAv183	2	9	9	4	2	7	3	1	37	-	4	6	3	4	13
F-230xTj-1	-	-	-	2	1	4	1	-	8	1	1	6	2	1	1
F-230xTj-16	-	-	-	-	-	2	-	1	3	-	-	3	-	-	-
F-208xTj-16	-	-	1	7	11	2	1	-	22	1	4	6	5	9	2
F-1276xTj-16	-	-	-	4	13	30	17	3	67	6	13	11	3	17	42
F-1639xPB186	-	-	-	6	6	3	1	3	19	3	4	4	1	-	3
F-1166xPB186	-	-	1	8	5	21	17	-	52	3	9	12	6	14	27
F-166xAv.49	-	-	-	-	-	2	2	-	4	-	1	1	1	-	3
F-166xPB-186	-	-	-	3	1	12	3	-	19	3	2	5	1	3	12
F-370xPB186	-	-	-	-	1	-	-	-	1	-	1	-	-	-	-
F-173xAv.49	-	-	-	6	2	2	1	-	11	3	3	1	3	-	2
F-570xPB-186	-	1	3	8	10	4	1	-	27	2	4	5	7	6	3
Totals	3	29	155	405	445	501	148	35	1721	263	382	438	310	332	438

The above Table I classifies the individual seedlings for their resistance to South American Leaf Disease, for sporulation by this disease, and for the incidence of Catacauma Huberi. There are only 3 seedlings or .17% in Class 2 on the Langford scale of resistance to SALD, 29 seedlings or 1.69% in Class 3, 155 seedlings or 9.00% in Class 4, and 405 seedlings or 23.53% in Class 5. Thus 592 seedlings or 34.39% of the total number rate Class 5 or better in their resistance to SALD.

Table I shows that a relatively high amount of sporulation by SALD occurs among the seedlings of these crosses. A total of 1083 or 62.92% of the trees exhibit some sign of sporulation. This figure is divided as follows: 15.28% of the seedlings have only sparse sporulation; in 22.19% of them moderate sporulation occurs; and 25.45% of the seedlings sporulate profusely.

The incidence of attacks by Catacauma Huberi is also high. A total of 1080 or 62.75% of the seedlings are suffering attacks by this fungus. In 18.01% of the cases the attacks are very light; moderate infections are found in 19.29% of the seedlings; and heavy attacks occur in 25.45% of the trees. By some coincidence the percentage of seedlings exhibiting heavy sporulation by SALD and the percentage of trees heavily attacked by Catacauma Huberi, is identical (25.45%).

Table II

Seedling Family	Resistance Class 1	2	3	4	5	Percentage Total Classes 1-5
F-315 x Av.49	-	-	11.1%	22.2%	44.5%	77.8%
F-707 x PB186	-	-	3.7	29.6	40.8	74.1
F-316 x Av.49	-	-	2.5	30.4	34.2	67.1
F6416 x Av.49	-	-	-	41.6	25.1	66.7
F4542 x Av183	-	5.4%	24.3	24.3	10.8	64.8
F-171 x Av.49	-	-	4.6	18.4	37.0	60.0
F1168 x GL-1	-	-	-	20.7	37.9	58.6
F-315 x Tj-16	-	3.0	9.1	21.2	24.3	57.6
F-173 x Av.49	-	-	-	-	54.5	54.5
F1693 x PB186	-	-	-	18.7	31.3	50.0
F-570 x PB186	-	-	3.7	11.1	29.6	44.4

The above Table II lists the 11 seedling families having the highest percentages of seedlings resistant to SALD (classes 1-5). The table gives the percentage of seedlings in each family which fall into each of the first five resistance categories. The best four of these families are: F-315 x Av.49, F-707 x PB-186, F-316 x Av.49, and F-6416 x Av.49. However, the families having the highest percentages of their seedlings in classes 2-4 are: F-4542 x Av.183, F-6416 x Av.49, F-315 x Av.49, and F-707 x PB-186, F-316 x Av.49, and F-315 x Tj-16. The combination of F-4542 x Av.183 is especially important since 29.7% of its seedlings fall into resistance classes 2-3. The same cross is also outstanding among the 1940 seedling families.

In the following Table III, the eleven seedling families with the highest percentages of resistant seedlings are presented to demonstrate the comparative amounts of sporulation among the seedlings of each of these families. When comparing the families one notes a considerable variation in the percentage of seedlings which have sporulated. This difference ranges from 27.0% in the case of seedlings of F-4542 x Av.183, to 75.0% among the seedlings of the cross F-6416 x Av.49. The families with the lowest percentages of sporulation by SALD are: F-4542 x Av.183, F-570 x PB-186, and F-315 x Tj-16.

Table III

Seedling Family	Sporulation by SALD Light	Medium	Heavy	Percentage Total Trees Sporulating.
F-315 x Av.49	16.7%	22.2%	22.2%	61.1%
F-707 x PB186	22.3	33.3	---	55.6
F-316 x Av.49	29.1	12.6	21.6	63.3
F-6416x Av.49	33.3	16.7	25.0	75.0
F-4542x Av183	---	10.8	16.2	27.0
F-171 x Av.49	16.9	18.4	26.2	61.5
F-1168x GL-1	13.8	35.8	13.8	63.4
F-315 x Tj-16	24.2	9.1	12.1	45.4
F-173 x Av.49	27.3	27.3	9.0	63.6
F-1693x PB186	25.0	18.7	12.5	56.2
F-570 x PB186	7.4	14.8	18.5	40.7

Catacauma Huberi (Black Crust) has attacked to some extent, 62.75% of all the seedlings from these crosses. The seedlings of F-1693 x PB-186 have exhibited the highest resistance to this fungus; only 18.75% of the seedlings being infected. This is illustrated in Table IV. The other ten families which gave many seedlings resistant to SALD, have nearly 50.0% or more of their seedlings suffering attacks of Black Crust. The families most resistant to Black Crust fungus are: F-173 x Av.49, F-707 x PB-186, and F-315 x Tj-16.

The cross of F-315 x Av.49 has the highest percentage of seedlings resistant to SALD but it is the most heavily hit by Black Crust, of the 11 families. The seedling family of F-6416 x Av.49 has a high percentage of its seedlings attacked by Catacauma but most of the infections are very light.

Among the other families of the 1939 crosses, the family of F-5566 x Av.49 has only 30.6% of its seedlings attacked by Black Crust. The family F-1639 x PB-186 has 21.0% of its seedlings infected by this fungus, and it rates second to F-1693 x PB-186 in resistance to this disease.

Table IV

Seedling Family	Catacauma Huberi Light	Medium	Heavy	Percentage Total Trees Infected
F-315 x Av.49	33.4%	22.2%	22.2%	77.8%
F-707 x PB186	25.9	11.1	11.1	48.1
F-316 x Av.49	29.1	15.2	11.4	55.7
F-6416x Av.49	58.3	8.4	---	66.7
F-4542x Av183	8.1	10.8	35.2	54.1
F-171 x Av.49	23.1	26.2	9.2	58.5
F-1168x GL-1	18.9	17.9	26.6	63.4
F-315 x Tj-16	12.1	24.2	12.1	48.4
F-173 x Av.49	27.3	---	18.0	45.3
F-1693x PB186	6.25	6.25	6.25	18.75
F-570 x PB186	25.9	22.2	11.1	59.2

Table V is a summary of the 11 seedling families which have given the most resistant seedling(to SALD). The seedling family of F-4542 x Av.183 is probably the most outstanding. It has many resistant seedlings and the amount of sporulation by SALD is the lowest of any of the families. However, more than 50% of the seedlings in this family have been attacked by Catacauma Huberi.

The combination of F-315 x Tj-16 has a good percentage of resistant seedlings, the amount of sporulation by SALD is low, and attacks by Catacauma Huberi are much less severe than in most of the families.

The family of F-570 x PB-186 has a relatively low percentage of sporulation by SALD.

The four families which have the highest percentages of seedlings resistant to SALD, sporulate heavily and are heavily attacked by Black Crust. The best of these four families is F-707 x PB-186, which has a lower rate of sporulation by SALD and is less seriously attacked by Black Crust than the other three families.

Table V

Seedling Family	Seedlings in Classes 1-5 for Resistance to SALD	Seedlings Sporulating with SALD	Seedlings Attacked by Catacauma Huberi
F-315 x Av.49	77.8%	61.6%	77.8%
F-707 x PB-186	74.1	55.6	48.1
F-316 x Av.49	67.1	63.3	55.7
F-6416 x Av.49	66.7	75.0	66.7
F-4542 x Av-183	64.8	27.0	54.1
F-171 x Av.49	60.0	61.5	58.5
F-1168 x GL-1	58.6	63.4	63.4
F-315 x Tj-16	57.6	45.4	48.4
F-173 x Av.49	54.5	63.6	45.3
F-1693 x PB-186	50.0	56.2	18.75
F-570 x PB-186	44.4	40.7	59.2

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