Supplementary Materials

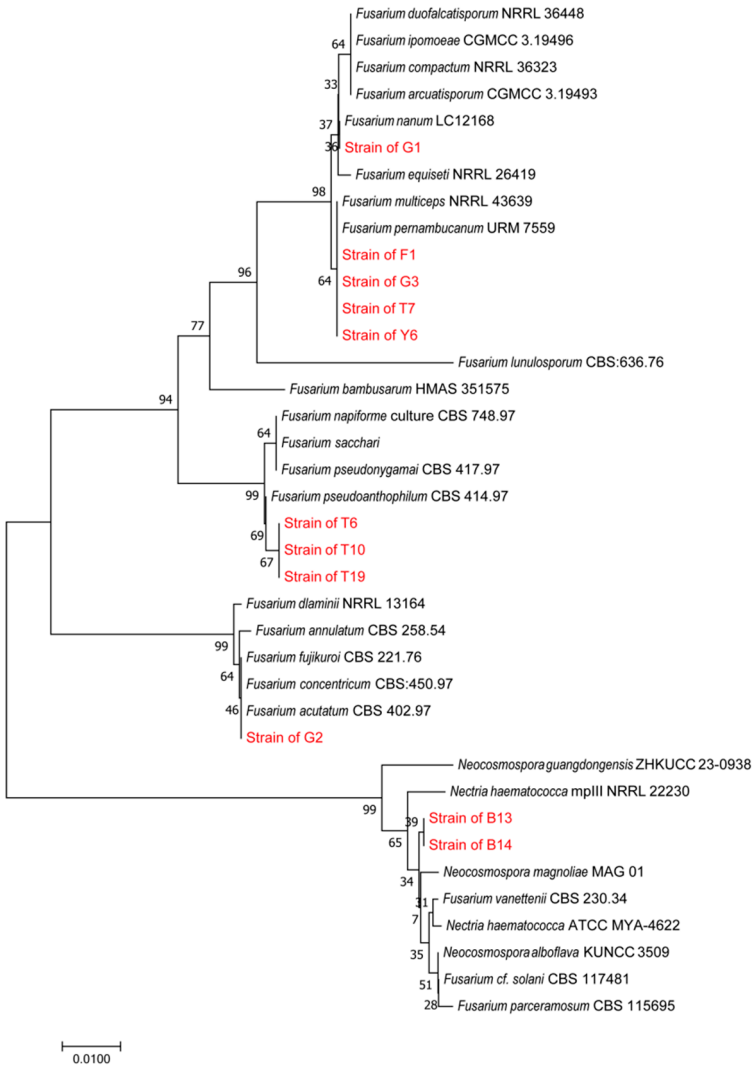


Figure S1 Phylogenetic tree of culturable Fusarium isolates obtained from *Areca catechu*, constructed by the neighbor-joining (NJ) method in MEGA 7.0 based on ITS sequences, with bootstrap support based on 1000 replicates.

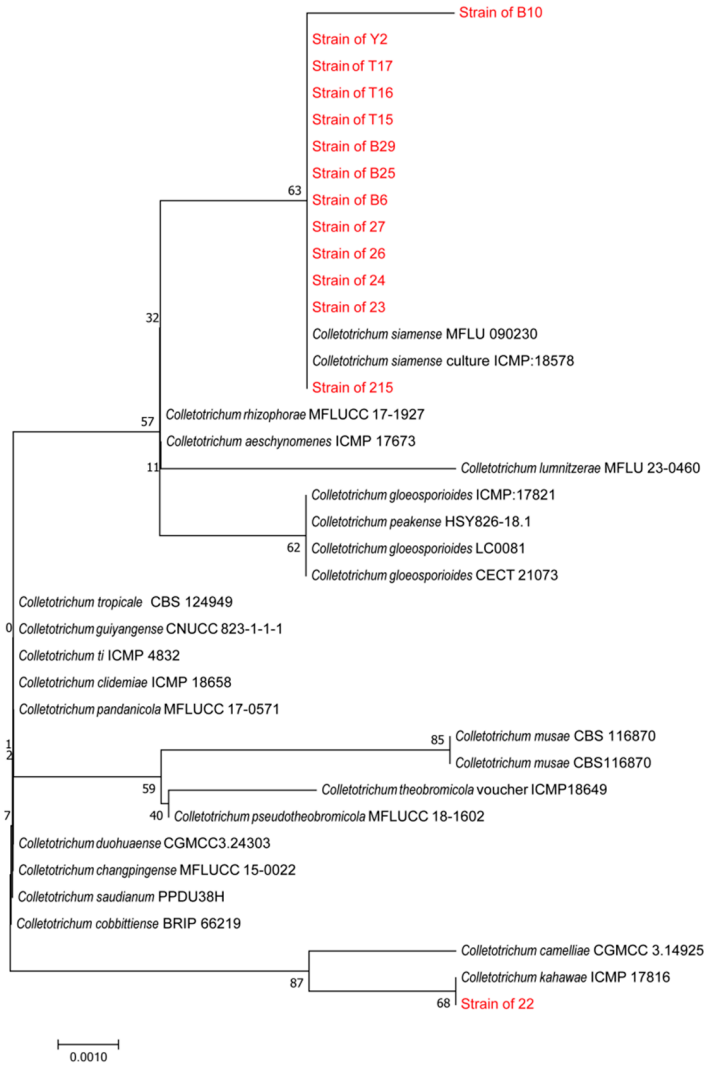


Figure S2 Phylogenetic tree of culturable Colletotrichum isolates obtained from *Areca catechu*, constructed by the neighbor-joining (NJ) method in MEGA 7.0 based on ITS sequences, with bootstrap support based on 1000 replicates.

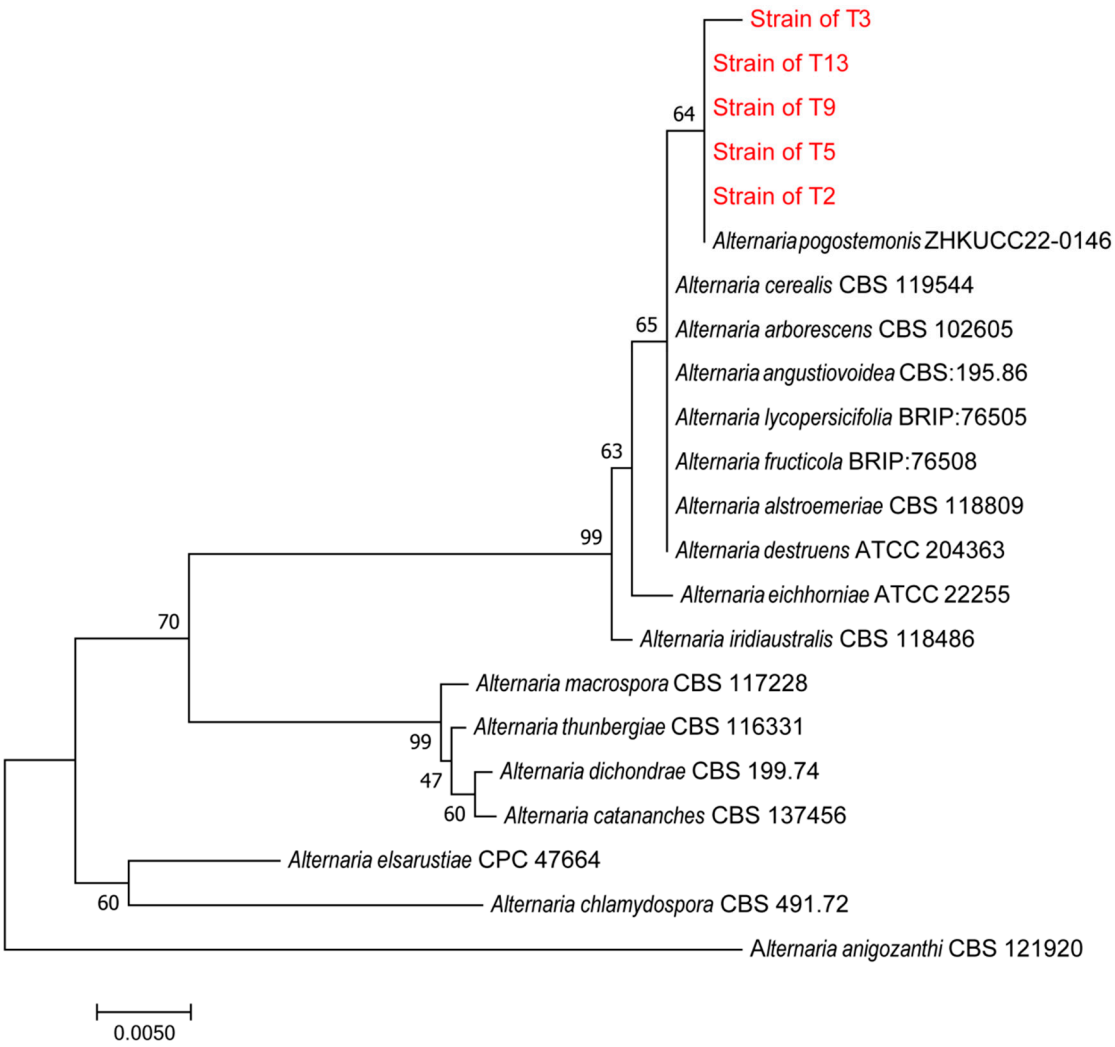


Figure S3 Phylogenetic tree of culturable Alternaria isolates obtained from *Areca catechu*, constructed by the neighbor-joining (NJ) method in MEGA 7.0 based on ITS sequences, with bootstrap support based on 1000 replicates.

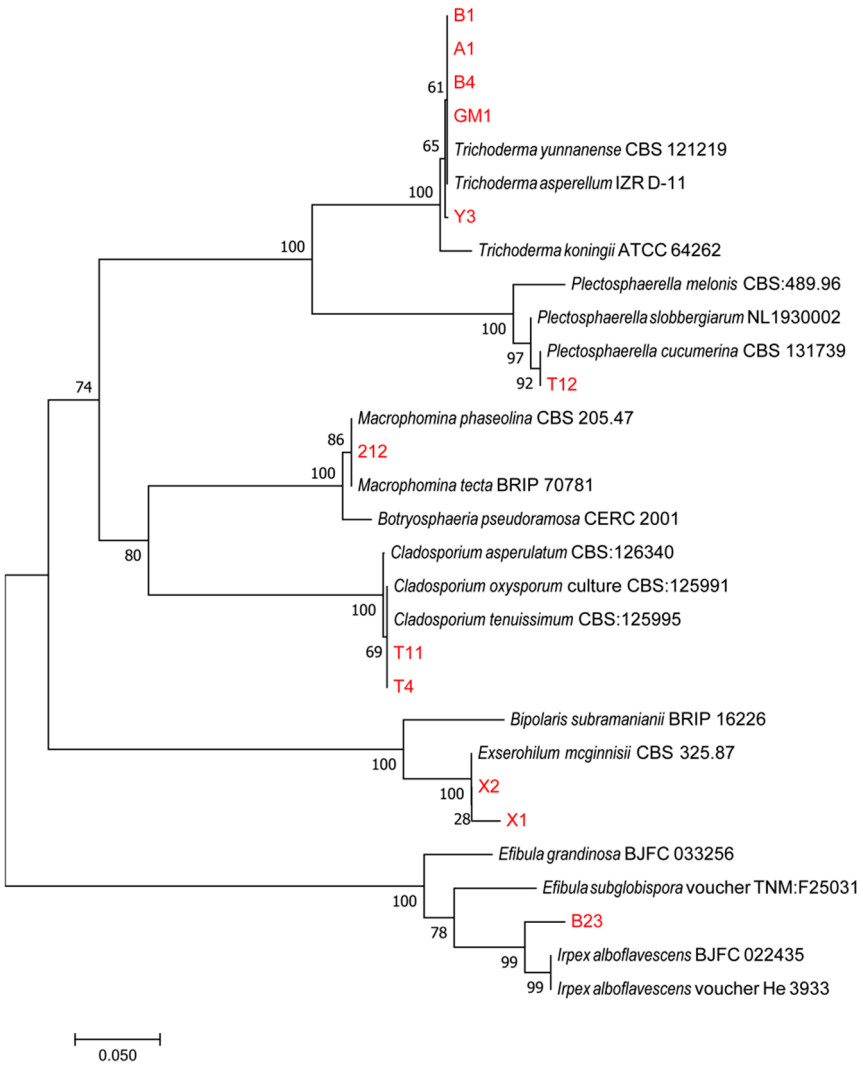


Figure S4 Phylogenetic tree of culturable other Genus isolates obtained from *Areca catechu*, constructed by the neighbor-joining (NJ) method in MEGA 7.0 based on ITS sequences, with bootstrap support based on 1000 replicates.

Table S1 Detailed information on the five sampling areas

city	Coordinates	Cycle (years)	Soil	Height	disease severity	Sampled tissue	Symptoms of samples
Sanya	18.503°N, 109.340°E	8	latosol	3-4	severe	leaves; fruits; Peduncle	**Leaf:** Brown and purple-blue spots, accompanied by yellowing circular lesions. **Peduncle:** Brown, decaying tissues, occasionally with fungal hyphae. **Fruit:** Black spots, occasionally with fungal hyphae.
Ledong	18.564°N, 108.808°E	5-7	latosol	3-4	mild	leaves; fruits; Peduncle	
Dongfang	19.097°N, 108.855°E	5-7	latosol	3-4	severe	leaves; fruits; Peduncle	
Baisha	19.236°N, 109.404°E	5-7	latosol	3-4	severe	leaves; Peduncle	
Baisha	19.257°N, 109.427°E	5-7	latosol	3-4	severe	leaves; fruits; Peduncle	

Table S2 Concentration gradients of five selected pesticides were used to determine the respective EC_{50} values of the isolates against each pesticide.

pesticide	the concentration gradients	isolate
Ethylicin	(0, 3.125, 6.25, 12.5, 25, 50)	G2, G1, T7, T13, T15, T9, T16, G3, F2, T2, T4, F1, T12, T11, T5, T19
	(0, 6.25, 12.5, 25, 50, 100)	T17, B13, T6, T10
Tebuconazole	(0, 3.125, 6.25, 12.5, 25, 50)	G3, T2, F1, F2, G1, T12, T9, G2, B13, T15, T7
	(0, 0.2, 0.4, 0.8, 1.6, 3.2)	T16, T17, T5, T19, T10, T6
	(0, 12.5, 25, 50, 75, 100)	T13, T4, T11
Difenoconazole	(0, 0.3125, 0.625, 1.25, 2.5, 5)	T15, T9, T10, T19, T6, B13, T7, T13, T5, T12, T16, F2
	(0, 0.625, 1.25, 2.5, 5, 10)	G3, F1, T17
	(0, 2.5, 5, 10, 15, 20)	G2, T4
Trifloxystrobin	(0, 1.25, 2.5, 5, 10, 15)	G1, G2, T11
	(0, 2.5, 5, 10, 15, 20)	G1, G3, T11, T13, T19, T17, T15, T12, G2, T6, T16, B13, T2, F2, T10, T5, T9
	(0, 25, 50, 75, 100, 150)	T4, F1, T7
Prochloraz	(0, 1.25, 2.5, 5, 10, 15)	T17, T2, T5, T12
	(0, 0.15, 0.3, 0.6, 1, 1.2)	T7, T11, T9, G1, T13
	(0, 0.03, 0.05, 0.1, 0.15, 0.2)	T10, T16, T15, B13, T6
	(0, 0.25, 0.5, 1, 2, 4)	F2, T4, G2, F1
	(0, 0.125, 0.25, 0.5, 1, 2)	G3
	(0, 0.03, 0.05, 0.07, 0.1, 0.15)	T19

Table S3 EC_{50} values of five pesticides against the 20 isolates

Pesticides	Mix (ppm)	Max (ppm)	Mean (ppm)	SD (ppm)	Variance (ppm)	CV
Ethylicin	4.627	32.974	14.843	6.982	48.744	0.47
Tebuconazole	0.061	22.365	7.005	7.246	52.497	1.034
Difenoconazole	0.168	10.667	1.432	2.246	5.043	1.568
Trifloxystrobin	0.734	175.798	20.4	49.937	2493.735	2.448
Prochloraz	0.01	3.553	0.681	0.86	0.74	1.263

Table S4 EC_{50} values of Ethylicin against the 20 isolates.

Number	Isolate	EC_{50}（ppm）	Virulence regression equation	R^2
1	T15	10.67	y=3.016x-3.101	0.91
2	T16	15.95	y=2.119x-2.548	0.928
3	T17	18.672	y=4.364x-5.548	0.951
4	T2	4.627	y=3.659x-2.434	0.973
5	T5	11.978	y=2.824x-3.045	0.929
6	T9	12.629	y=1.551x-1.709	0.941
7	T13	32.974	y=1.514x-2.298	0.993
8	G1	22.541	y=1.744x-2.359	0.949
9	G3	9.03	y=1.540x-1.472	0.967
10	G2	16.938	y=3.549x-4.361	0.972
11	T10	9.994	y=6.176x-6.174	1
12	T19	8.955	y=1.551x-1.476	0.959
13	T6	8.33	y=2.228x-2.051	0.966
14	B13	18.924	y=4.374x-5.586	0.975
15	T4	8.18	y=2.103x-1.919	0.958
16	T11	7.311	y=2.841x-2.455	0.959
17	F1	20.642	y=1.764x-2.319	0.948
18	F2	16.962	y=3.549x-4.363	0.939
19	T7	24.11	y=3.649x-5.044	0.991
20	T12	17.452	y=2.112x-2.623	0.975

Table S5 EC_{50} values of Tebuconazole against the 20 isolates.

Number	Isolate	EC_{50}（ppm）	Virulence regression equation	R^2
1	T15	1.414	y=1.582x-0.271	0.989
2	T16	0.496	y=1.350x-0.411	0.954
3	T17	0.641	y=1.622x-0.314	0.986
4	T2	14.245	y=1.820x-2.100	0.982
5	T5	0.617	y=1.380x+0.289	0.917
6	T9	10.219	y=1.147x-1.158	0.935
7	T13	10.235	y=1.225x-1.238	0.934
8	G1	0.869	y=1.098x+0.067	0.995
9	G3	1.743	y=0.866x-0.209	0.906
10	G2	3.296	y=2.374x-1.230	0.995
11	T10	0.237	y=2.743x+1.714	0.987
12	T19	0.061	y=1.650x+2.007	0.948
13	T6	0.561	y=1.406+0.353	0.971
14	B13	2.435	y=1.231x-0.476	0.908
15	T4	17.472	y=2.407x-2.990	0.953
16	T11	9.429	y=1.644x-1.602	0.922
17	F1	14.809	y=1.373x-1.607	0.96
18	F2	12.270	y=0.940x-1.024	0.973
19	T7	16.691	y=2.547x-3.114	0.977
20	T12	22.365	y=0.836x-1.128	0.939

Table S6 EC_{50} values of Difenoconazole against the 20 isolates.

Number	Isolate	EC_{50}（ppm）	Virulence regression equation	R^2
1	T15	0.777	y=1.393x-0.153	0.941
2	T16	0.330	y=1.734x-0.836	0.901
3	T17	0.466	y=0.746x-0.247	0.970
4	T2	2.392	y=3.776x-1.431	0.924
5	T5	1.210	y=1.217x-0.101	0.956
6	T9	0.719	y=0.574x-0.082	0.967
7	T13	0.443	y=0.587x-0.208	0.974
8	G1	0.464	y=0.866x+0.289	0.961
9	G3	1.010	y=1.496x-0.007	0.947
10	G2	0.168	y=0.556x+0.430	0.927
11	T10	0.796	y=0.552x-0.055	0.982
12	T19	0.621	y=0.647x-0.134	0.961
13	T6	1.082	y=0.945x-0.032	0.945
14	B13	1.309	y=1.170x-0.137	0.997
15	T4	10.667	y=3.904x-4.013	0.947
16	T11	1.125	y=1.153x-0.059	0.917
17	F1	2.082	y=0.373x-0.119	0.961
18	F2	0.543	y=0.458x-0.122	0.945
19	T7	1.530	y=0.867x-0.160	0.962
20	T12	0.907	y=1.122x+0.047	0.946

Table S7 EC_{50} values of Trifloxystrobin against the 20 isolates.

Number	Isolate	EC_{50}（ppm）	Virulence regression equation	R^2
1	T15	3.339	y=2.052x-1.074	0.971
2	T16	5.012	y=1.290x-1.003	0.988
3	T17	4.281	y=2.552x-1.612	0.986
4	T2	3.401	y=1.890x-1.005	0.969
5	T5	4.166	y=1.681x-1.042	0.970
6	T9	2.731	y=1584x-0.691	0.982
7	T13	4.349	y=1.894x-1.209	0.983
8	G1	4.107	y=0.883x-0.542	0.912
9	G3	2.284	y=2.007x-0.720	0.947
10	G2	0.734	y=0.110x-0.015	0.951
11	T10	1.113	y=1.464x-0.068	0.979
12	T19	1.375	y=1.195x-0.165	0.938
13	T6	0.821	y=0.945x+0.081	0.927
14	B13	2.032	y=1.074x-0.331	0.992
15	T4	6.406	y=0.936x-0.755	0.927
16	T11	8.762	y=1.325x-1.249	0.969
17	F1	175.798	y=2.155x-4.837	0.988
18	F2	12.704	y=1.782x-1.967	0.931
19	T7	155.897	y=2.397x-5.256	0.982
20	T12	8.678	y=2.998x-2.814	0.952

Table S8 EC_{50} values of Prochloraz against the 20 isolates.

Number	Isolate	EC_{50}（ppm）	Virulence regression equation	R^2
1	T15	0.091	y=2.466x+2.566	0.967
2	T16	0.077	y=1.423x-0.146	0.974
3	T17	0.546	y=1.307x-0.343	0.952
4	T2	0.966	y=0.781x-0.012	0.971
5	T5	0.942	y=1.405x-0.036	0.849
6	T9	0.548	y=0.409x+0.107	0.979
7	T13	1.046	y=1.384x-1.447	0.949
8	G1	0.106	y=0.468x+0.455	0.984
9	G3	0.215	y=0.631x+0.421	0.992
10	G2	0.082	y=0.837x+0.907	0.976
11	T10	0.010	y=0.51x+1.01	0.951
12	T19	0.072	y=3.044x+3.480	0.954
13	T6	0.049	y=1.024x+1.344	0.961
14	B13	0.036	y=1.115x+1.609	0.941
15	T4	1.249	y=0.700x-0.068	0.817
16	T11	0.71	y=1.931x+0.287	0.969
17	F1	1.974	y=1.587x-0.469	0.909
18	F2	0.325	y=0.993x+0.485	0.956
19	T7	1.021	y=0.588x-0.005	0.984
20	T12	3.553	y=0.882x-0.486	0.952