

Supplementary material

Diversity of the seedborne fungi and pathogenicity of *Fusarium* species associated with intercropped soybean

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Table S1 Information of the fungi isolates recovered from soybean seeds, identified species and GenBank accession numbers of *rDNA ITS*, *EF-1 α* and *RPB2*.

Isolates	Soybean varieties	Sampling locations	GenBank accession numbers			Fungal genera or species
			<i>rDNA ITS</i>	<i>EF1-α</i>	<i>RPB2</i>	
LS01	Gongqiu 4	Zigong	MN871538	MN901558	MN880735	<i>F. fujikuroi</i>
LS02	Gongxia 8173-ZLJ	Zigong	MN871539	MN901538	MN880736	<i>F. fujikuroi</i>
LS07	Gongxia 925	Zigong	MN871576	MN901527	MN880774	<i>F. fujikuroi</i>
LS09	Gongqiu 5-YT	Zigong	MN955506	MN901529	MN880737	<i>F. fujikuroi</i>
LS13	Gongqiu 5-YT	Zigong	MN955507	MN901535	MN880775	<i>F. fujikuroi</i>
LS16	Tongdou 11	Nanchong	MN871577	MN901537	MN880776	<i>F. fujikuroi</i>
LS18	Gongxia 9	Zigong	MN871542	MN901533	MN880738	<i>F. fujikuroi</i>
LS22	Gongqiu 5-YT	Zigong	MN871546	MN901546	MN880739	<i>F. fujikuroi</i>
LS23	Gongqiu 5-YT	Zigong	MN955508	MN901543	MN880772	<i>F. fujikuroi</i>

LS27	Gongxia 925	Zigong	MN955509	MN901540	MN880740	<i>F. fujikuroi</i>
LS30	Gongqiu 4	Zigong	MN871550	MN901561	MN880762	<i>F. fujikuroi</i>
LS31	Gongqiu 4	Zigong	MN871551	MN901542	MN880741	<i>F. fujikuroi</i>
LS35	Gongqiu 8	Zigong	MN871552	MN901560	MN880742	<i>F. fujikuroi</i>
LS36	Gongqiu 8	Zigong	MN955510	MN901544	MN880746	<i>F. fujikuroi</i>
LS37	Gongqiu 5-YT	Zigong	MN955511	MN901553	MN880747	<i>F. fujikuroi</i>
LS44	Gongxia 925	Zigong	MN955512	MN901525	MN880748	<i>F. fujikuroi</i>
LS45	Gongqiu 8	Zigong	MN871554	MN901545	MN880743	<i>F. fujikuroi</i>
LS46	Gongqiu 8	Zigong	MN955514	MN901541	MN880744	<i>F. fujikuroi</i>
LS47	Gongxia 925	Zigong	MN955513	MN901550	MN880749	<i>F. fujikuroi</i>
LS54	Gongxia8173-ZLJ	Zigong	MN955515	MN901530	MN880750	<i>F. fujikuroi</i>
LS58	Gongxia8173-ZLJ	Zigong	MN955516	MN901554	MN880751	<i>F. fujikuroi</i>
LS67	Gongqiu 4	Zigong	MN955517	MN901552	MN880752	<i>F. fujikuroi</i>
LS77	Tongdou 11	Nanchong	MN871583	MN901551	MN880753	<i>F. fujikuroi</i>
LS78	Tongdou 11	Nanchong	MN871584	MN901528	MN880754	<i>F. fujikuroi</i>
LS84	Gongxia369-1	Zigong	MN955518	MN901532	MN880773	<i>F. fujikuroi</i>
LS88	Gongxia369-1	Zigong	MN955519	MN901534	MN880755	<i>F. fujikuroi</i>
LS89	Gongxia369-1	Zigong	MN955520	MN901539	MN880756	<i>F. fujikuroi</i>
LS94	Gongqiu5-YT	Zigong	MN955521	MN901526	MN880771	<i>F. fujikuroi</i>
LS95	Gongqiu 5-BJ	Zigong	MN955522	MN901547	MN880757	<i>F. fujikuroi</i>
LS99	Gongxia 925	Zigong	MN955523	MN901524	MN880761	<i>F. fujikuroi</i>
LS100	Gongxia 925	Zigong	MN871588	MN901548	MN880758	<i>F. fujikuroi</i>
LS101	Gongxia 925	Zigong	MN871559	MN901531	MN880745	<i>F. fujikuroi</i>
LS104	Gongxia8173-GJ	Zigong	MN955524	MN901536	MN880759	<i>F. fujikuroi</i>
LS142	Gongqiu 5-YT	Zigong	MN871563	MN901555	MN880770	<i>F. fujikuroi</i>
LS148	Gongqiu 8	Zigong	MN955525	MN901563	MN880763	<i>F. fujikuroi</i>
LS159	Gongxia8173-GJ	Zigong	MN871566	MN901564	MN880764	<i>F. fujikuroi</i>
LS162	Gongxia8173-GJ	Zigong	MN871567	MN901556	MN880765	<i>F. fujikuroi</i>
LS166	Tongdou 11	Nanchong	MN955526	MN901549	MN880760	<i>F. fujikuroi</i>
LS167	Tongdou 11	Nanchong	MN955527	MN901562	MN880766	<i>F. fujikuroi</i>
LS177	Gongqiu 4	Zigong	MN871569	MN901557	MN880767	<i>F. fujikuroi</i>

LS199	Gongqiu 4	Zigong	MN955528	MN901559	MN880768	<i>F. fujikuroi</i>
LS200	Gongqiu 4	Zigong	MN871575	MN901565	MN880769	<i>F. fujikuroi</i>
LS08	Gongxia 925	Zigong	MN955529	MN901580	MN943312	<i>F. incarnatum</i>
LS19	Gongqiu 5-YT	Zigong	MN871543	MN901601	MN943321	<i>F. incarnatum</i>
LS24	Gongqiu 5-YT	Zigong	MN955530	MN901590	MN943328	<i>F. incarnatum</i>
LS25	Gongxia 369-1	Zigong	MN871547	MN901596	MN943309	<i>F. incarnatum</i>
LS26	Gongxia 369-1	Zigong	MN871548	MN901581	MN943310	<i>F. incarnatum</i>
LS28	Gongxia 925	Zigong	MN871549	MN901579	MN943311	<i>F. incarnatum</i>
LS29	Gongxia 925	Zigong	MN955531	MN901582	MN943322	<i>F. incarnatum</i>
LS32	Gongqiu 8	Zigong	MN955532	MN901588	MN943316	<i>F. incarnatum</i>
LS34	Gongqiu 8	Zigong	MN955533	MN901598	MN943313	<i>F. incarnatum</i>
LS40	Gongxia 8173-ZLJ	Zigong	MN871553	MN901583	MN943314	<i>F. incarnatum</i>
LS60	Gongqiu 5-YT	Zigong	MN871555	MN901595	MN943327	<i>F. incarnatum</i>
LS69	Gongqiu 8	Zigong	MN871578	MN901586	MN943315	<i>F. incarnatum</i>
LS72	Nandou 12	Chongzhou	MN871579	MN901587	MN943317	<i>F. incarnatum</i>
LS73	Tongdou 11	Nanchong	MN871580	MN901584	MN943318	<i>F. incarnatum</i>
LS760	Gongqiu 5-BJ	Zigong	MN871556	MN901597	MN943331	<i>F. incarnatum</i>
LS820	Gongxia 369-1	Zigong	MN871557	MN901592	MN943330	<i>F. incarnatum</i>
LS87	Gongxia 369-1	Zigong	MN871587	MN901591	MN943319	<i>F. incarnatum</i>
LS106	Gongqiu 4	Zigong	MN871560	MN901585	MN943320	<i>F. incarnatum</i>
LS139	Gongqiu 5-YT	Zigong	MN871562	MN901589	MN943326	<i>F. incarnatum</i>
LS153	Gongxia 8173-ZLJ	Zigong	MN871564	MN901594	MN943323	<i>F. incarnatum</i>
LS154	Gongxia 8173-ZLJ	Zigong	MN955534	MN901593	MN943324	<i>F. incarnatum</i>
LS157	Gongxia 8173-ZLJ	Zigong	MN871565	MN901599	MN943325	<i>F. incarnatum</i>
LS184	Nanxia	Nanchong	MN871571	MN901578	MN943332	<i>F. incarnatum</i>
LS186	Nanxia	Nanchong	MN871572	MN901600	MN943329	<i>F. incarnatum</i>
LS03	Tongdou 11	Nanchong	MN871540	MN901574	MN880782	<i>F. proliferatum</i>
LS20	Gongqiu 5-YT	Zigong	MN871544	MN901571	MN880783	<i>F. proliferatum</i>
LS91	Gongqiu 5-YT	Zigong	MN871558	MN901570	MN880784	<i>F. proliferatum</i>
LS137	Gongqiu 5-YT	Zigong	MN871561	MN901576	MN880781	<i>F. proliferatum</i>
LS181	Gongqiu 5-BJ	Zigong	MN871570	MN901577	MN880777	<i>F. proliferatum</i>

LS192	Gongqiu 5-YT	Zigong	MN955535	MN901573	MN880778	<i>F. proliferatum</i>
LS193	Gongqiu 5-YT	Zigong	MN871573	MN901572	MN880779	<i>F. proliferatum</i>
LS196	Gongqiu 5-YT	Zigong	MN955539	MN901575	MN880780	<i>F. proliferatum</i>
LS197	Gongqiu 5-YT	Zigong	MN871574	MN901569	MN880785	<i>F. proliferatum</i>
LS71	Nandou 12	Chongzhou	MN871581	MN901602	MN883833	<i>F. asiaticum</i>
LS76	Nandou 12	Chongzhou	MN871582	MN901603	MN883834	<i>F. asiaticum</i>
LS82	Nandou 12	Chongzhou	MN871585	MN901604	MN883835	<i>F. asiaticum</i>
LS86	Nandou 12	Chongzhou	MN871586	MN901605	MN883836	<i>F. asiaticum</i>
LS12	Gongxia 8173-GJ	Zigong	MN871541	MN901567	MN883830	<i>F. verticillioides</i>
LS21	Gongqiu 5-YT	Zigong	MN871545	MN901568	MN883832	<i>F. verticillioides</i>
LS172	Gongxia 369-1	Zigong	MN871568	MN901566	MN883831	<i>F. verticillioides</i>
1	Tongdou 11	Zigong	MN883902	–	–	<i>Colletotrichum</i> sp.
7	Gongxia 925	Zigong	MN883903	–	–	<i>Colletotrichum</i> sp.
11	Gongxia 8173-GJ	Zigong	MN883904	–	–	<i>Colletotrichum</i> sp.
42	Gongxia 8173-GJ	Zigong	MN883906	–	–	<i>Colletotrichum</i> sp.
47	Gongqiu 8	Zigong	MN883907	–	–	<i>Colletotrichum</i> sp.
55	Gongxia 8173-ZLJ	Zigong	MN883908	–	–	<i>Colletotrichum</i> sp.
83	Gongxia 369-1	Zigong	MN883909	–	–	<i>Colletotrichum</i> sp.
169	Gongxia 369-1	Zigong	MN883910	–	–	<i>Colletotrichum</i> sp.
171	Gongxia 369-1	Zigong	MN883911	–	–	<i>Colletotrichum</i> sp.
180	Gongqiu 4	Zigong	MN883912	–	–	<i>Colletotrichum</i> sp.
14	Tongdou 11	Zigong	MN883913	–	–	<i>Colletotrichum</i> sp.
15	Tongdou 11	Zigong	MN883914	–	–	<i>Colletotrichum</i> sp.
38	Gongqiu 5-BJ	Zigong	MN871589	–	–	<i>Colletotrichum</i> sp.
39	Gongxia 8173-ZLJ	Zigong	MN871590			<i>Colletotrichum</i> sp.
56	Gongxia 8173-ZLJ	Zigong	MN871591	–	–	<i>Colletotrichum</i> sp.
57	Gongxia 8173-ZLJ	Zigong	MN871592	–	–	<i>Colletotrichum</i> sp.
61	Gongqiu 5-YT	Zigong	MN871593	–	–	<i>Colletotrichum</i> sp.
80	Gongxia 369-1	Zigong	MN871594	–	–	<i>Colletotrichum</i> sp.
81	Gongxia 369-1	Zigong	MN871595	–	–	<i>Colletotrichum</i> sp.
103	Gongxia 925	Zigong	MN871596	–	–	<i>Colletotrichum</i> sp.

109	Gongqiu 4	Zigong	MN871597	–	–	<i>Colletotrichum</i> sp.
110	Gongqiu 4	Zigong	MN871598	–	–	<i>Colletotrichum</i> sp.
124	Gongqiu 5-BJ	Zigong	MN871599	–	–	<i>Colletotrichum</i> sp.
141	Gongqiu 5-YT	Zigong	MN871600	–	–	<i>Colletotrichum</i> sp.
175	Gongqiu 4	Zigong	MN871601	–	–	<i>Colletotrichum</i> sp.
145	Gongqiu 8	Zigong	MN871602	–	–	<i>Colletotrichum</i> sp.
155	Gongxia 8173-ZLJ	Zigong	MN871603	–	–	<i>Colletotrichum</i> sp.
168	Gongxia 369-1	Zigong	MN871604	–	–	<i>Colletotrichum</i> sp.
170	Gongxia 369-1	Zigong	MN871605	–	–	<i>Colletotrichum</i> sp.
176	Gongqiu 4	Zigong	MN871606	–	–	<i>Colletotrichum</i> sp.
179	Gongqiu 4	Zigong	MN871607	–	–	<i>Colletotrichum</i> sp.
183	Nanxia	Nanchong	MN871608	–	–	<i>Colletotrichum</i> sp.
189	Gongxia 8173-ZLJ	Zigong	MN871609	–	–	<i>Colletotrichum</i> sp.
43	Gongqiu 8	Zigong	MN871610	–	–	<i>Alternaria</i> sp.
74	Gongqiu 5-BJ	Zigong	MN871611	–	–	<i>Alternaria</i> sp.
104	Gongxia 925	Zigong	MN871612	–	–	<i>Alternaria</i> sp.
105	Gongxia 925	Zigong	MN871613	–	–	<i>Alternaria</i> sp.
114	Gongqiu 8	Zigong	MN871614	–	–	<i>Alternaria</i> sp.
150	Gongqiu 8	Zigong	MN871615	–	–	<i>Alternaria</i> sp.
185	Nanxia	Nanchong	MN871616	–	–	<i>Alternaria</i> sp.
29	Gongqiu 4	Zigong	MN871617	–	–	<i>Corynespora</i> sp.
86	Gongxia 369-1	Zigong	MN871618	–	–	<i>Corynespora</i> sp.
131	Gongxia 925	Zigong	MN871619	–	–	<i>Corynespora</i> sp.
96	Tongdou 11	Zigong	MN871620	–	–	<i>Corynespora</i> sp.
138	Gongqiu 5-YT	Zigong	MN871621	–	–	<i>Corynespora</i> sp.
147	Gongqiu 8	Zigong	MN871622	–	–	<i>Corynespora</i> sp.
44	Gongxia 8173-ZLJ	Zigong	MN871623	–	–	<i>Diaporthe/Phomopsis</i> sp.
62	Nandou 12	Chongzhou	MN871639	–	–	<i>Diaporthe/Phomopsis</i> sp.
107	Gongqiu 4	Zigong	MN871624	–	–	<i>Diaporthe/Phomopsis</i> sp.

111	Gongqiu 4	Zigong	MN871625	–	–	<i>Diaporthe/Phomopsis</i> sp.
117	Tongdou 11	Zigong	MN871626	–	–	<i>Diaporthe/Phomopsis</i> sp.
151	Nandou 12	Chongzhou	MN871627	–	–	<i>Diaporthe/Phomopsis</i> sp.
163	Tongdou 11	Zigong	MN871634	–	–	<i>Diaporthe/Phomopsis</i> sp.
37	Gongqiu 8	Zigong	MN871628	–	–	<i>Stagonosporopsis</i> sp.
113	Gongqiu 8	Zigong	MN883901	–	–	<i>Stagonosporopsis</i> sp.
178	Gongqiu 4	Zigong	MN871629	–	–	<i>Stagonosporopsis</i> sp.
17	Gongxia 9	Zigong	MN871630	–	–	<i>Chaetomium</i> sp.
36	Gongqiu 8	Zigong	MN871631	–	–	<i>Chaetomium</i> sp.
72	Gongxia 369-1	Zigong	MN871632	–	–	<i>Chaetomium</i> sp.
128	Gongxia 8173-GJ	Zigong	MN871633	–	–	<i>Didymella</i> sp.
6	Gongqiu 5-BJ	Zigong	MN871635	–	–	<i>Trichoderma</i> sp.
182	Gongxia 9	Zigong	MN871636	–	–	<i>Podospora</i> sp.
48	Gongxia 9	Zigong	MN871637	–	–	<i>Podospora</i> sp.
10	Gongxia 8173-GJ	Zigong	MN871638	–	–	<i>Macrophomina</i> sp.
41	Gongqiu 5-YT	Zigong	MN871640	–	–	<i>Thielavia</i> sp.
164	Tongdou 11	Zigong	MN871641	–	–	<i>Botryosphaeria</i> sp.

Notes: *rDNA ITS*, ribosomal internal transcribed spacer region; *EF-1 α* , translation elongation factor 1 α gene; *RPB2*, RNA polymerase II second largest subunit gene. “–” means gene sequences of *EF-1 α* or *RPB2* were not amplified and analyzed for these isolates.

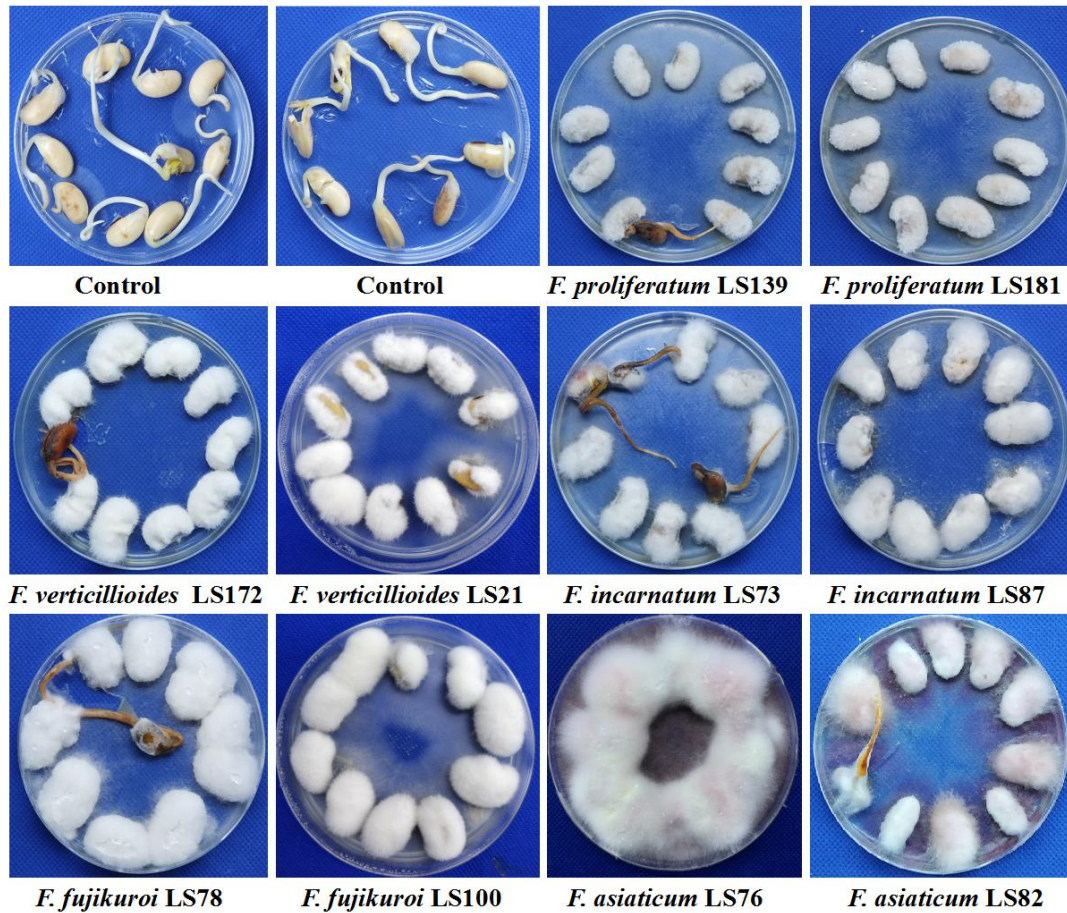


Figure S1. Symptoms infected by the other representative isolates of *Fusarium* species associated with soybean seed decay. The representative isolates include *F. proliferatum* LS137 and LS181; *F. fujikuroi* LS78 and LS100; *F. verticillioides* LS172 and LS21; *F. asiaticum* LS76 and LS82; and *F. incarnatum* LS73 and LS87; Control means the seeds inoculated with PDA medium instead of *Fusarium* isolates. After seven-day culture on PDA plates, mycelium growth of *Fusarium* species on the seed surface and the infection symptoms inside the seeds were observed.