

Supplementary materials for the article:  
Wang S. et al. Structural and Dynamic Analysis of Leaf-Associated Fungal Community of Walnut Leaves Infected by Leaf Spot Disease Based Illumina High-Throughput Sequencing Technology.

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Table SI  
Sample name and sampling time.

Sampling time	Health leaf		Infected leaf		Disease severity
Mid-May (1 <sup>st</sup> sampling)	HE1	HE1.1 HE1.2 HE1.3 HE1.4 HE1.5	IN1	IN1.1 IN1.2 IN1.3 IN1.4 IN1.5	$0 < DLA \leq 5\%$ Disease spots sporadically distributed
Mid-June (2 <sup>nd</sup> sampling)	HE2	HE2.1 HE2.2 HE2.3 HE2.4 HE2.5	IN2	IN2.1 IN2.2 IN2.3 IN2.4 IN2.5	$5\% < DLA \leq 10\%$ Disease area expansion
Early July to late August (3 <sup>rd</sup> sampling)	HE3	HE3.1 HE3.2 HE3.3 HE3.4 HE3.5	IN3	IN3.1 IN3.2 IN3.3 IN3.4 IN3.5	$10\% < DLA \leq 25\%$ Disease spots begin to connect
Late August to early September (4 <sup>th</sup> sampling)	HE4	HE4.1 HE4.2 HE4.3 HE4.4 HE4.5	IN4	IN4.1 IN4.2 IN4.3 IN4.4 IN4.5	$25\% < DLA \leq 50\%$ Most of the disease spots are connected and narrow
Early October (5 <sup>th</sup> sampling)	HE5	HE5.1 HE5.2 HE5.3 HE5.4 HE5.5	IN5	IN5.1 IN5.2 IN5.3 IN5.4 IN5.5	$DLA > 50\%$ Disease spots are all connected and wider

DLA – Diseased Leaf Area, indicates the ratio of diseased area to leaf area

Table SII

The statistics results obtained in each step of the data processing.

Sample name	Raw PE(#)	Combined(#)	Qualified(#)	Nochime(#)	Base(nt)	AvgLen(nt)	Q20	Q30	GC%	Effective%
HE1.1	80,881	80,186	79,642	78,446	16,618,980	212	99.59	99.15	43.68	96.99
HE1.2	95,434	94,573	93,946	92,785	19,772,396	213	99.56	99.11	43.97	97.22
HE1.3	97,463	96,622	95,960	94,417	20,274,841	215	99.58	99.14	45.04	96.87
HE1.4	99,748	98,897	98,251	97,089	20,721,147	213	99.61	99.22	44.38	97.33
HE1.5	98,256	97,474	96,809	95,357	20,358,710	213	99.62	99.22	44.84	97.05
IN1.1	93,291	92,468	91,751	89,348	19,207,165	215	99.59	99.15	44.86	95.77
IN1.2	85,620	84,879	84,278	81,458	17,615,297	216	99.61	99.2	45.87	95.14
IN1.3	84,531	83,821	83,271	79,945	17,270,042	216	99.61	99.21	45.95	94.57
IN1.4	96,177	95,285	94,049	91,785	19,544,219	213	99.61	99.2	43.86	95.43
IN1.5	87,653	86,838	86,168	83,685	18,063,397	216	99.59	99.17	45.3	95.47
HE2.1	99,372	98,825	98,057	93,693	19,788,457	211	99.41	98.73	43.69	94.29
HE2.2	81,301	80,812	80,196	75,758	16,003,674	211	99.39	98.72	43.49	93.18
HE2.3	99,689	99,119	98,308	90,802	19,371,617	213	99.35	98.64	43.35	91.09
HE2.4	99,158	98,599	97,822	92,591	19,865,734	215	99.35	98.64	44.71	93.38
HE2.5	88,687	88,112	87,295	82,109	17,777,684	217	99.33	98.61	45.03	92.58
IN2.1	83,545	83,044	78,935	76,855	17,368,474	226	99.25	98.45	46.54	91.99
IN2.2	94,485	93,920	92,400	90,176	21,298,229	236	99.06	98.07	47.26	95.44
IN2.3	82,198	81,743	80,625	79,084	18,160,209	230	99.21	98.36	46.14	96.21
IN2.4	99,959	99,366	94,976	92,427	21,516,724	233	99.15	98.24	47.11	92.46
IN2.5	93,453	92,527	91,048	88,868	20,707,871	233	99.09	98.12	46.1	95.09
IN3.2	99,325	98,766	95,252	90,227	21,423,679	237	99.85	99.67	48.55	90.84
HE3.1	99,862	98,503	98,284	95,602	19,424,639	203	99.71	99.57	40.31	95.73
HE3.2	84,559	83,728	83,604	81,105	16,690,924	206	99.85	99.72	41.47	95.92
HE3.3	97,419	96,026	95,799	93,045	19,117,799	205	99.71	99.55	41.19	95.51
HE3.4	81,135	80,303	80,193	78,075	15,885,828	203	99.8	99.68	40.56	96.23
HE3.5	91,562	90,377	90,154	88,261	18,197,610	206	99.71	99.56	41.19	96.39

Sample name	Raw PE(#)	Combined(#)	Qualified(#)	Nochime(#)	Base(nt)	AvgLen(nt)	Q20	Q30	GC%	Effective%
IN3.1	95,733	95,107	94,715	91,046	19,619,543	215	99.58	99.07	44.52	95.1
IN3.3	82,187	81,626	81,223	78,201	16,986,247	217	99.54	99	45.07	95.15
IN3.4	98,463	97,790	97,324	94,347	20,263,228	215	99.57	99.07	43.73	95.82
IN3.5	81,260	80,702	80,230	78,120	16,740,422	214	99.57	99.07	43.83	96.14
HE4.1	70,371	69,715	69,617	66,831	16,596,582	248	99.29	98.52	48.96	94.97
HE4.2	75,974	75,380	74,734	71,362	17,259,642	242	99.34	98.65	47.76	93.93
HE4.3	50,010	49,851	48,386	44,083	11,684,534	265	99.26	98.44	51.12	88.15
HE4.4	77,169	76,661	76,588	72,143	15,914,145	221	99.51	99.01	45.25	93.49
HE4.5	72,859	72,308	72,238	66,587	16,098,130	242	99.36	98.68	48.02	91.39
IN4.1	66,990	66,496	66,430	65,287	15,408,758	236	99.36	98.65	48.52	97.46
IN4.2	75,666	75,453	23,465	67,905	16,454,786	242	99.17	98.25	48.52	89.74
IN4.3	80,212	79,450	79,320	74,718	17,827,211	239	99.27	98.46	48.96	93.15
IN4.4	76,564	75,826	75,733	68,888	16,748,097	243	99.28	98.5	48.76	89.97
IN4.5	80,604	79,995	79,905	71,310	16,772,612	235	99.33	98.59	48.45	88.47
HE5.1	90,712	90,189	89,436	87,927	20,296,856	231	99.18	98.32	48.6	96.93
HE5.2	98,067	97,490	96,741	95,169	21,709,136	228	99.24	98.44	48.17	97.04
HE5.3	91,791	91,184	90,495	88,655	20,078,415	226	99.28	98.52	47.65	96.58
HE5.4	95,949	95,291	94,488	92,806	21,360,576	230	99.22	98.41	47.82	96.72
HE5.5	98,539	97,918	97,180	95,281	21,528,213	226	99.21	98.39	47.26	96.69
IN5.1	84,208	83,599	81,408	78,495	18,403,723	234	99.11	98.19	47.94	93.22
IN5.2	82,733	82,171	81,040	78,238	18,524,012	237	99.07	98.21	48.66	94.57
IN5.3	95,013	94,387	92,470	89,507	20,965,716	234	99.16	98.37	48.92	94.21
IN5.4	86,939	86,413	85,652	82,277	19,010,330	231	99.2	98.35	48.97	94.64
IN5.5	98,978	98,371	97,585	93,431	21,312,505	228	99.22	98.4	48.14	94.4

Table SIII  
Alpha Diversity index for each sample.

Sample name	Observed_species	Shannon	Simpson	Chao1	ACE	Goods_coverage	PD_whole_tree
HE1.1	223	3.339	0.807	278.275	303.856	0.998	37.35
HE1.2	149	2.571	0.72	192.05	192.258	0.999	26.205
HE1.3	223	3.391	0.827	275.286	285.28	0.999	41.436
HE1.4	221	3.186	0.795	314.261	284.065	0.998	38.215
HE1.5	210	3.372	0.829	273	286.597	0.999	37.998
HE2.1	403	3.942	0.88	531.026	561.948	0.997	79.299
HE2.2	436	3.993	0.881	612.04	646.162	0.996	88.922
HE2.3	478	3.824	0.836	616.061	663.562	0.996	98.896
HE2.4	513	3.949	0.851	665.03	708.216	0.996	104.054
HE2.5	574	4.246	0.883	873.261	888.752	0.995	111.559
HE3.1	312	1.944	0.468	361.915	364.117	0.998	121.163
HE3.2	456	2.521	0.609	647.11	728.027	0.996	109.056
HE3.3	328	2.16	0.577	354.238	365.475	0.999	104.352
HE3.4	363	1.918	0.508	465.818	485.991	0.997	92.75
HE3.5	352	1.962	0.581	484	483.219	0.997	90.254
HE4.1	424	4.805	0.93	527.054	559.766	0.997	88.942
HE4.2	377	4.79	0.936	492.098	505.609	0.997	77.679
HE4.3	307	3.27	0.829	962.714	515.869	0.997	77.182
HE4.4	402	4.977	0.937	503.477	479.628	0.998	81.832
HE4.5	407	4.722	0.923	506.552	525.471	0.997	80.341
HE5.1	303	4.231	0.899	477.488	499.649	0.997	59.148
HE5.2	359	4.361	0.908	474.672	508.997	0.997	69.393
HE5.3	314	4.571	0.916	407.655	442.538	0.998	59.572
HE5.4	321	4.47	0.91	390.766	416.669	0.998	62.996
HE5.5	332	4.527	0.911	465.4	489.564	0.997	68.129

Sample name	Observed_species	Shannon	Simpson	Chao1	ACE	Goods_coverage	PD_whole_tree
IN1.1	216	3.564	0.842	251.333	263.501	0.999	39.152
IN1.2	253	3.755	0.869	379.323	368.335	0.998	42.651
IN1.3	250	3.78	0.875	353.053	370.656	0.998	47.411
IN1.4	229	3.484	0.814	269.317	282.486	0.999	41.701
IN1.5	322	4.327	0.907	499.073	496.137	0.997	60.274
IN2.1	443	4.398	0.91	665.069	637.253	0.996	90.122
IN2.2	430	4.698	0.919	575.147	594.859	0.997	80.442
IN2.3	423	4.776	0.921	556.288	594.229	0.997	77.495
IN2.4	442	4.656	0.917	593.412	603.549	0.997	86.482
IN2.5	496	5.035	0.938	725.059	729.34	0.996	94.88
IN3.1	488	4.558	0.864	606.163	622.813	0.997	116.866
IN3.2	471	4.845	0.894	552.341	576.154	0.997	89.742
IN3.3	433	4.443	0.86	518.312	524.408	0.998	83.357
IN3.4	399	4.203	0.808	502.056	506.325	0.998	99.609
IN3.5	394	4.353	0.827	481.069	495.359	0.998	113.077
IN4.1	466	4.883	0.882	510.063	538.137	0.998	85.063
IN4.2	637	5.386	0.907	847.988	833.189	0.996	132.074
IN4.3	593	4.875	0.869	744.211	762.682	0.996	118.453
IN4.4	474	5.09	0.901	571.932	565.819	0.998	80.571
IN4.5	530	5.207	0.903	665.043	659.57	0.997	96.828
IN5.1	535	5.378	0.935	653.407	666.204	0.997	97.878
IN5.2	491	5.082	0.91	612.643	626.564	0.997	90.372
IN5.3	424	4.45	0.849	492.471	512.336	0.998	79.88
IN5.4	525	4.644	0.863	703.026	712.748	0.996	96.659
IN5.5	429	4.336	0.853	511.078	515.677	0.998	78.967

Table SIV  
Alpha Diversity index.

Group	Observed_species	Shannon	Simpson	Chao1	ACE	Goods_coverage	PD_whole_tree
HE1	205	3.172	0.796	266.574	270.411	0.999	36.241
HE2	480	3.991	0.866	659.484	693.728	0.996	96.546
HE3	362	2.101	0.549	462.616	485.366	0.997	103.515
HE4	383	4.513	0.911	598.379	517.269	0.997	81.195
HE5	325	4.432	0.909	443.196	471.483	0.997	63.848
IN1	254	3.782	0.861	350.42	356.223	0.998	46.238
IN2	446	4.713	0.921	622.995	631.846	0.997	85.884
IN3	437	4.48	0.851	531.988	545.012	0.998	100.53
IN4	540	5.088	0.892	667.847	671.879	0.997	102.598
IN5	480	4.778	0.882	594.525	606.706	0.997	88.751

Table SV

The species with significant differences between the healthy group and the infected group.

Group	Phylum	Class	Order	Family	Genus
HE1-IN1	<i>Basidiomycota</i>	<i>Tremellomycetes,</i> <i>Cystobasidiomycetes</i>	<i>Cystobasidiomycetes_ord_Inc</i> <i>ertae_sedis</i>	<i>Cladosporiaceae, Symmetrosporaceae</i>	<i>Cercospora,</i> <i>Cladosporium, Phoma,</i> <i>Symmetrospora</i>
HE2-IN2	<i>Ascomycota,</i> <i>Basidiomycota</i>	<i>Tremellomycetes,</i> <i>Dothideomycetes,</i> <i>Eurotiomycetes,</i> <i>Cystobasidiomycetes,</i> <i>Saccharomycetes</i>	<i>Tremellales, Pleosporales,</i> <i>Chaetothyriales,</i> <i>Cystobasidiomycetes_ord_Inc</i> <i>ertae_sedis, Diaporthales,</i> <i>Helotiales,</i> <i>Saccharomycetales,</i> <i>Dothideales, Eurotiales</i>	<i>Bulleribasidiaceae, Didymellaceae,</i> <i>Cladosporiaceae, Symmetrosporaceae,</i> <i>Chaetothyriales_fam_Incertae_sedis,</i> <i>Phaeosphaeriaceae, Aureobasidiaceae,</i> <i>Sclerotiniaceae, Aspergillaceae</i>	<i>Vishniacozyma,</i> <i>Cladosporium,</i> <i>Hannaella, Boeremia,</i> <i>Symmetrospora,</i> <i>Strelitziana,</i> <i>Colletotrichum,</i> <i>Aureobasidium,</i> <i>Botrytis, Aspergillus</i>
HE3-IN3	<i>Ascomycota,</i> <i>Basidiomycota</i>	<i>Tremellomycetes,</i> <i>Dothideomycetes,</i> <i>Leotiomycetes,</i> <i>Eurotiomycetes,</i> <i>Cystobasidiomycetes,</i> <i>Sordariomycetes,</i> <i>Microbotryomycetes</i>	<i>Tremellales, Capnodiales,</i> <i>Pleosporales,</i> <i>Chaetothyriales,</i> <i>Cystobasidiomycetes_ord_Inc</i> <i>ertae_sedis,</i> <i>Microbotryomycetes_ord_Inc</i> <i>ertae_sedis, Helotiales,</i> <i>Hypocreales, Hysteriales,</i> <i>Eurotiales, Polyporales,</i> <i>Hymenochaetales</i>	<i>Bulleribasidiaceae, Mycosphaerellaceae,</i> <i>Didymellaceae, Cladosporiaceae,</i> <i>Symmetrosporaceae,</i> <i>Chaetothyriales_fam_Incertae_sedis,</i> <i>Chrysozymaceae, Pleosporaceae,</i> <i>Hysteriaceae, Nectriaceae, Aspergillaceae,</i> <i>Meruliaceae, Schizoporaceae</i>	<i>Vishniacozyma,</i> <i>Cercospora,</i> <i>Ramularia,</i> <i>Cladosporium,</i> <i>Epicoccum, Phoma,</i> <i>Boeremia, Dioszegia,</i> <i>Symmetrospora,</i> <i>Stagonosporopsis,</i> <i>Strelitziana,</i> <i>Chrysozyma,</i> <i>Alternaria, Fusarium,</i> <i>Ceriporia</i>

HE4-IN4	Glomeromycota	<i>Dothideomycetes, Leotiomyces, Eurotiomyces, Cystobasidiomycetes, Sordariomyces, Agaricomycetes, Microbotryomycetes, Agaricostilbomycetes,</i>	<i>Capnodiales, Erysiphales, Chaetothyriales, Cystobasidiomycetes_ord_Incertae_sedis, Glomerellales, Sebacinales, Microbotryomycetes_ord_Incertae_sedis, Diaporthales, Agaricostilbales</i>	<i>Mycosphaerellaceae, Erysiphaceae, Symmetrosporaceae, Phaeosphaeriaceae, Glomerellaceae, Serendipitaceae, Chrysozymaceae, Exobasidiaceae, Hypocreales_fam_Incertae_sedis ,</i>	<i>Ramularia, Phyllactinia, Boeremia, Symmetrospora, Serendipita, Colletotrichum, Chrysozyma, Septoriella, Exobasidium, Acremonium, Golubevia, Hirsutella, Plectosphaerella, Gibberella</i>
		<i>Glomeromycetes</i>	<i>Helotiales, Exobasidiales, Golubeviales, Glomerales,</i>	<i>Golubeviaceae, Ophiocordycipitaceae, Glomeraceae</i>	
HE5-IN5	Glomeromycota	<i>Eurotiomyces, Cystobasidiomycetes, Sordariomyces, Agaricomycetes, Microbotryomycetes, Glomeromycetes</i>	<i>Capnodiales, Pleosporales, Chaetothyriales, Cystobasidiomycetes_ord_Incertae_sedis, Sebacinales, Microbotryomycetes_ord_Incertae_sedis, Diaporthales, Helotiales, Hypocreales, Golubeviales, Hysteriales, Glomerales, Polyporales</i>	<i>Mycosphaerellaceae, Didymellaceae, Cladosporiaceae, Symmetrosporaceae, Chaetothyriales_fam_Incertae_sedis, Phaeosphaeriaceae, Serendipitaceae, Chrysozymaceae, Pleosporaceae, Hypocreales_fam_Incertae_sedis, Golubeviaceae, Hysteriaceae, Glomeraceae, Tremellaceae, Leptosphaeriaceae, Meruliaceae</i>	<i>Vishniacozyma, Cercospora, Cladosporium, Microsphaera, Hannaella, Epicoccum, Phoma, Boeremia, Dioszegia, Symmetrospora, Strelitziana, Zasmidium, Serendipita, Chrysozyma, Septoriella, Acremonium, Golubevia, Cryptococcus, Ampelomyces, Ceriporia</i>



Table SVI  
Species Relative Abundance at Phylum Level (Group Analysis).

Taxonomy	<i>Ascomycota</i>	<i>Basidiomycota</i>	<i>Glomeromycota</i>	<i>Mucoromycota</i>	<i>Rozellomycota</i>	<i>Mortierellomycota</i>	<i>Chytridiomycota</i>	Others
HE1	0.306289	0.609732	0.000442	0	0	0	0	0.083538
IN1	0.405112	0.481011	0.000401	0	0	0	0	0.113476
HE2	0.30826	0.575174	0.001448	0.000114	0.000055	0	0	0.114951
IN2	0.496119	0.269113	0.00208	0.000123	0.000014	0.000005	0.000005	0.232542
HE3	0.067342	0.273496	0.001885	0.000005	0	0.000036	0	0.657236
IN3	0.413315	0.123172	0.003824	0	0.000018	0.000014	0	0.459658
HE4	0.624408	0.268043	0.000533	0.000005	0	0	0	0.107012
IN4	0.665403	0.112962	0.00213	0	0.000005	0	0	0.219501
HE5	0.605772	0.154722	0.000246	0	0	0	0	0.239261
IN5	0.681435	0.189713	0.001771	0	0.000005	0	0	0.127077

Table SVII  
Environmental conditions during the period of sampling.

Year	Month	Minimum temperature (°C)	Maximum temperature (°C)	Mean temperature (°C)	Rainfall (mm)
2018	May	16.4	26.6	21.5	137
	June	18.7	27.0	22.9	195
	July	22.0	29.8	25.9	340
	August	20.9	29.6	25.2	202
	September	17.7	24.6	21.2	262
	October	11.9	19.4	15.6	54

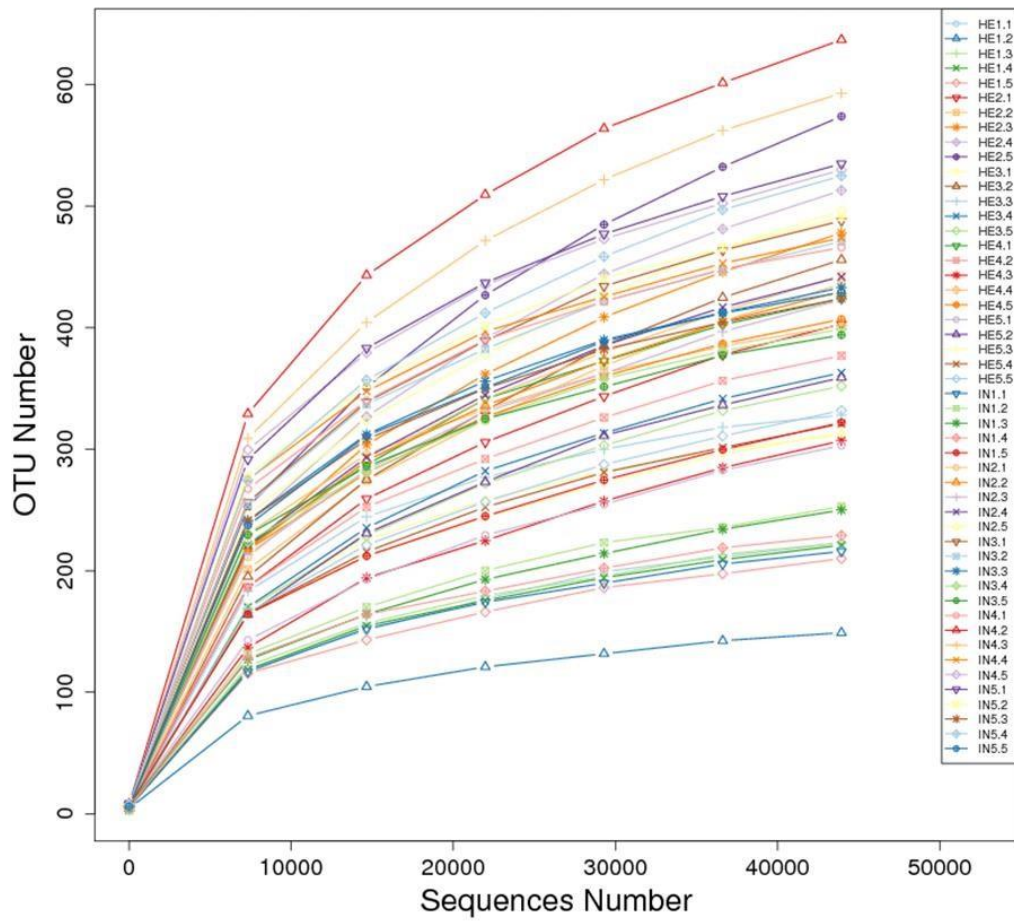


Fig. S1. Rarefaction curves of the fifty samples.

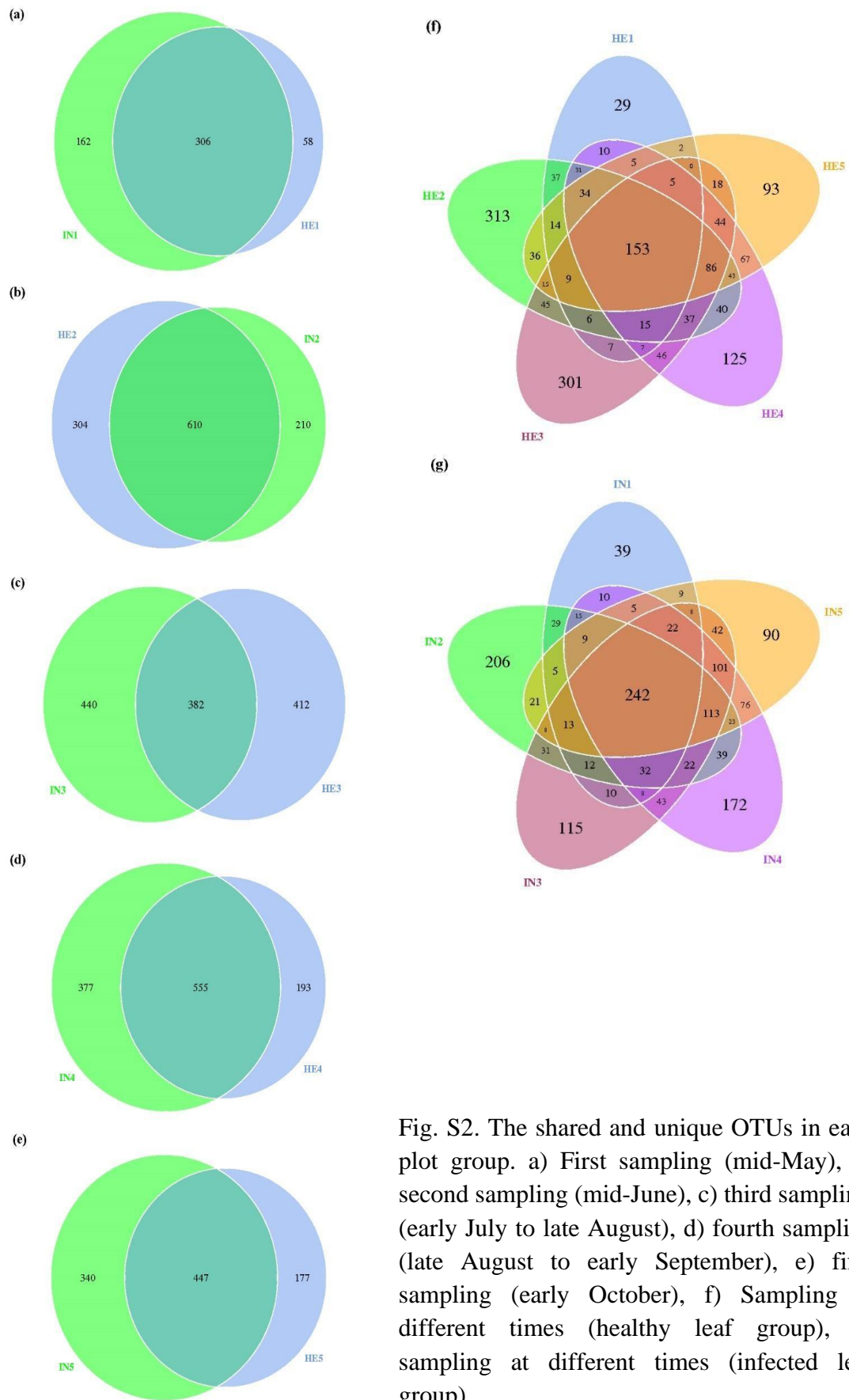
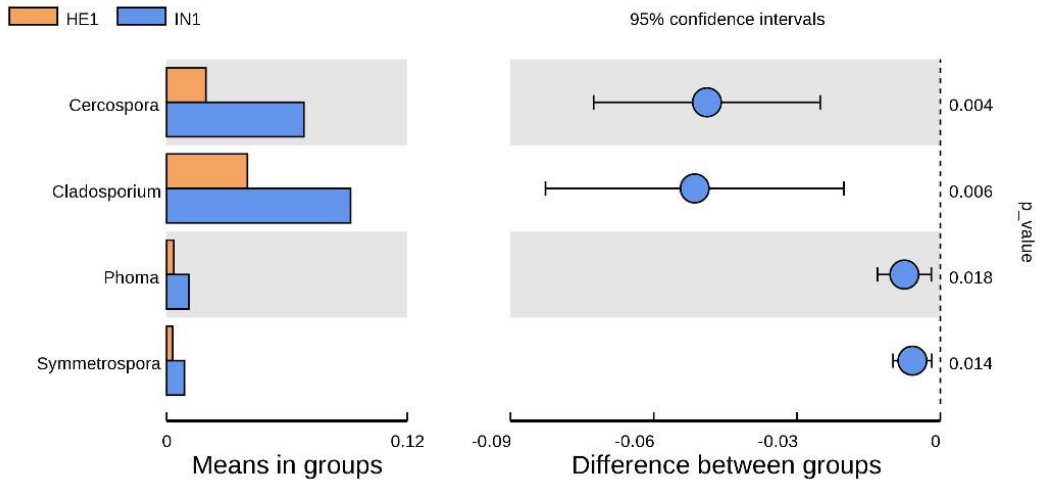


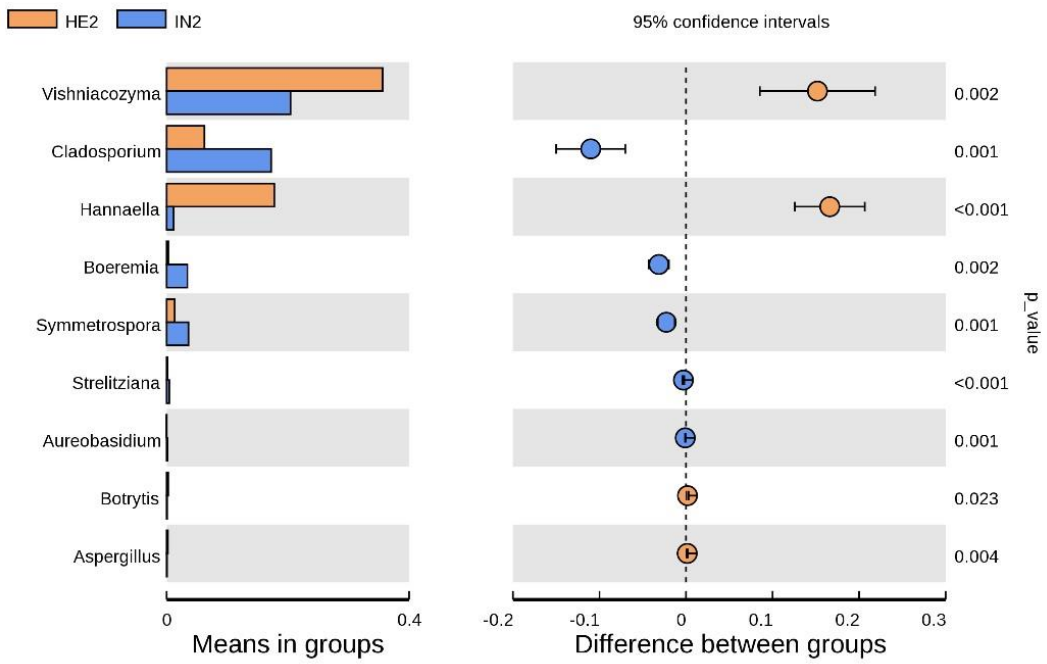
Fig. S2. The shared and unique OTUs in each plot group. a) First sampling (mid-May), b) second sampling (mid-June), c) third sampling (early July to late August), d) fourth sampling (late August to early September), e) fifth sampling (early October), f) Sampling at different times (healthy leaf group), g) sampling at different times (infected leaf group).



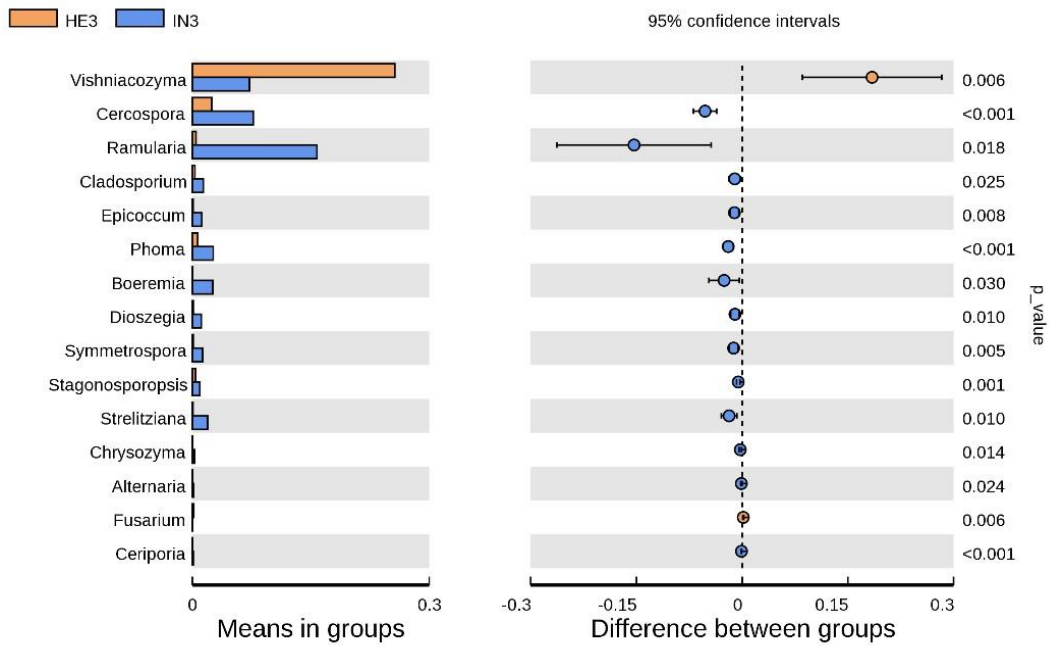
(a)



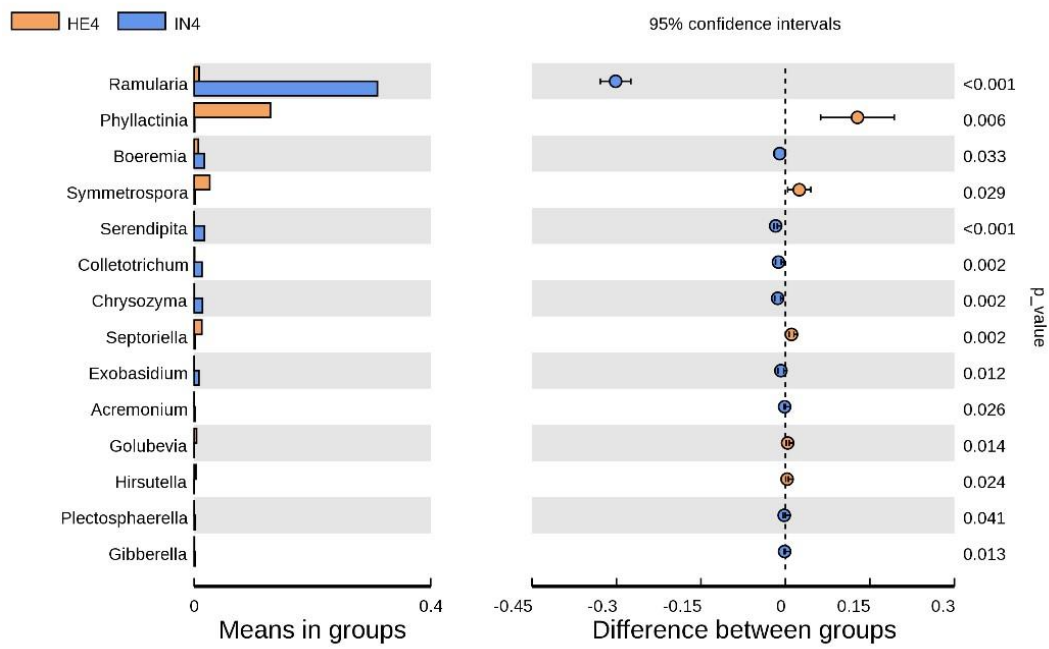
(b)



(c)



(d)



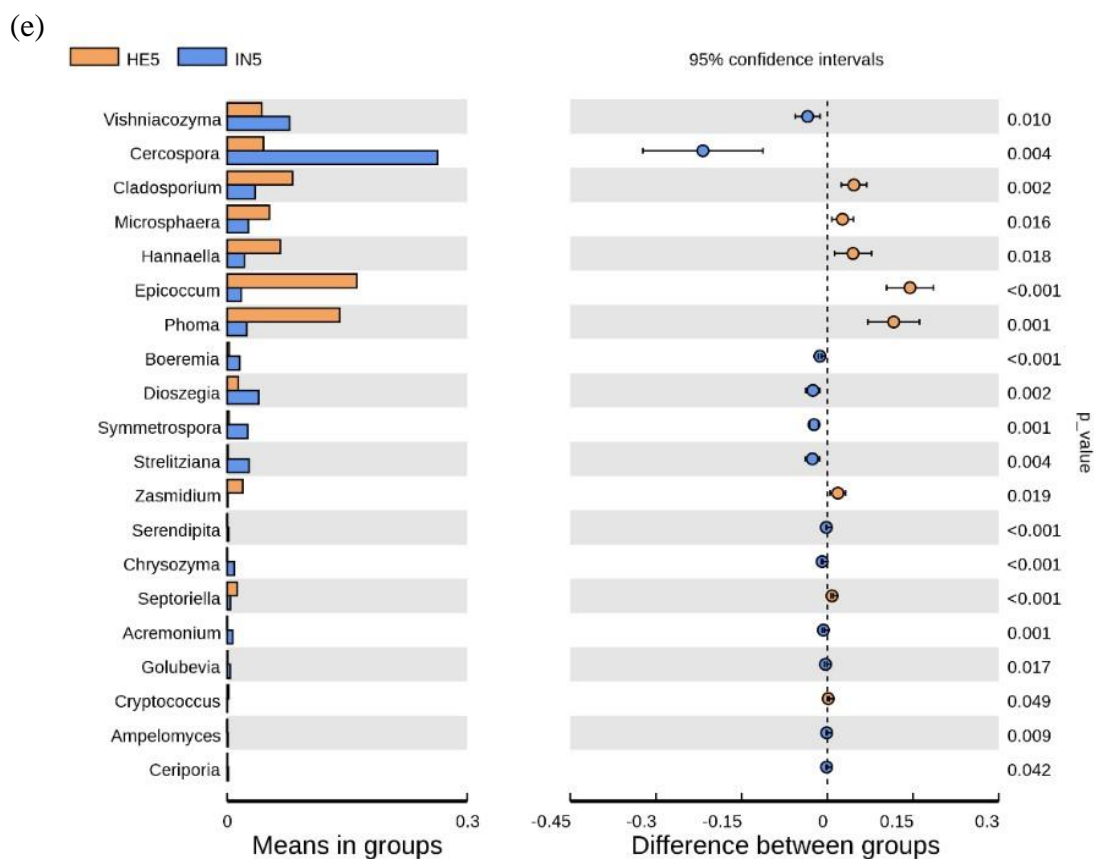


Fig. S5. a) Genera with significant differences between HE1 and IN1 groups, b) genera with significant differences between HE2 and IN2 groups, c) genera with significant differences between HE3 and IN3 groups, d) genera with significant differences between HE4 and IN4 groups, e) genera with significant differences between HE5 and IN5 groups.