

Supplementary Material

Synergistic Fungicide Mixtures Control Multiple-Fungicide Resistant *Fusarium* Complexes Causing Cowpea Root Rot in Hainan, China

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Table S1. Species and GenBank accession numbers of reference sequences used for phylogenetic analysis.

Species	Genbank Accession Numbers			
	ITS	<i>tef1</i>	<i>rpb2</i>	<i>CaM</i>
<i>Alternaria alternata</i>	MN020527.1	MW657639.1	PP351921.1	OR656670.1
<i>Fusarium rhinolophi</i>	PP791014.1	PP982538.1	PP959143.1	PP997258.1
<i>Fusarium nisikadoi</i>	PP336540.1	PV953863.1	PX990907.1	/
<i>Fusarium robustum</i>	NR159851.1	PQ260914.1	PQ274199.1	PQ240281.1
<i>Fusarium armeniacum</i>	AB587001.1	PX684572.1	PQ274098.1	PQ240137.1
<i>Fusarium tricinctum</i>	PP336537.1	PV268322.1	JX171629	/
<i>Fusarium avenaceum</i>	OK236563.1	PP874534.1	MG282401.1	MK547650.1
<i>Fusarium rosendophyticum</i>	OR034269.1	/	OR043855.1	OR043757.1
<i>Fusarium rosiradicicola</i>	PX684570.1	OR043914.1	OR043858.1	OR043761.1
<i>Fusarium flavoides</i>	PV020684.1	PV050416.1	PV023180.1	/
<i>Fusarium chongqingense</i>	MW016675.1	MW620138.1	MW474661.1	/
<i>Fusarium alpinum</i>	MW016688.1	MW620150.1	MW474672.1	/
<i>Fusarium longipes</i>	LC617097.1	MW377545.1	OP311663.1	PQ240235.1
<i>Fusarium graminearum</i>	LC384879.1	OM830309.1	OR425253.1	OP267550.1
<i>Fusarium poae</i>	OW985257.1	MT947532.1	OR425337.1	LR215862.1
<i>Fusarium languescens</i>	PV382123.1	MH484971.1	PV393050.1	PV393055.1
<i>Fusarium equiseti</i>	PQ797011.1	OR487147.1	PP132353.1	PP543256.1
<i>Fusarium fujikuroi</i>	OQ518897.1	PV779599.1	OP413446.1	OR133731.1
<i>Fusarium incarnatum</i>	PX741477.1	PX911383.1	MZ604830.1	/
<i>Fusarium oxysporum</i>	LN626919.1	OR733349.1	PX149240.1	FR828826.1
<i>Fusarium proliferatum</i>	OQ421597.1	PQ594431.1	OQ909545.1	ON205998.1
<i>Fusarium solani</i>	AM412597.1	OK247672.1	/	OQ722441.1
<i>Fusarium annulatum</i>	OP482320.1	OL960473.1	OP784446.1	MT010908.1
<i>Fusarium falciforme</i>	PV383491.1	MG272436.1	PV124668.1	PP479993.1
<i>Fusarium citri</i>	MW016522.1	PQ453591.1	OQ925428.1	OM714846.1
<i>Fusarium cugenangense</i>	PV400545.1	PZ142887.1	PV124682.1	PX974269.1
<i>Fusarium duoseptatum</i>	PX678767.1	MW594326.1	PQ356491.1	PQ273178.1
<i>Fusarium irregulare</i>	MK280829.1	MN200600.1	OQ978961.1	OM960764.1
<i>Fusarium foetens</i>	OR905647.1	PQ800083.1	PQ800090.1	ON423437.1
<i>Fusarium pernambucanum</i>	OR544493.1	LC800436.1	PZ797508.1	LC875783.1
<i>Fusarium nygamai</i>	PX091229.1	OL961517.1	MT010976.1	OP039355.1
<i>Fusarium nanum</i>	ON759742.1	PP942818.1	PP942845.1	OM960755.1
<i>Fusarium sulawesiense</i>	OR511758.1	LC800439.1	OR509687.1	OM960757.1
<i>Fusarium sudanense</i>	MG976228.1	OP487072.1	MN725015.1	MN534182.1
<i>Fusarium phaseoli</i>	OK012381.1	HE647964.1	KJ511281.1	MW834157.1
<i>Fusarium terricola</i>	PX587404.1	MN534042.1	LT996156.1	MN534189.1
<i>Fusarium suttonianum</i>	PP421949.1	PQ632701.1	PV124664.1	/
<i>Fusarium sambucinum</i>	/	PQ594434.1	PQ274212.1	PQ240284.1
<i>Fusarium gaditjirrii</i>	/	/	MN193909.1	AY639629.2
<i>Fusarium tardichlamydosporum</i>	/	ON032460.1	PX309201.1	OM960808.1

Table S2. Companies and countries of fungicides and related reagents used in this study.

Chemical	Company	Country
Tebuconazole	Jiangsu Fengdeng Agrochemical Co., Ltd.	China
Phenamacril	Zhejiang University	China
Difenoconazole	Jiangsu Yunong Chemical Co., Ltd.	China
Pydiflumetofen	Syngenta AG	Switzerland
Mefentrifluconazole	BASF SE	Germany
Fludioxonil	Syngenta AG	Switzerland
Azoxystrobin	Bayer AG	Germany
Carbendazim	Shandong Weifang Runfeng Chemical Co., Ltd.	China
DMSO	Beijing Coolaber Technology Co., Ltd.	China
SHAM	Beijing Coolaber Technology Co., Ltd.	China

Table S4. Disease incidence and disease index of four representative *Fusarium* isolates causing cowpea root rot under different fungicide treatments in greenhouse assays

	CK	Phe.	Pyd.	Teb.	Phe. + Teb.	Pyd. + Teb.
FIEHN13	100/55.6	100/50.0	100/44.4	100/33.3	25/13.9	0/0.0
FOHN22	100/61.1	75/36.1	100/33.3	75/30.6	0/0.0	25/2.8
FFHN2	100/50.0	75/30.6	100/44.4	100/33.3	25/8.3	0/0.0
FSHN3	100/50.0	100/27.8	100/33.3	100/33.3	50/11.1	50/11.1

Note: Each cell is presented as disease incidence (%) / disease index (DI). CK, sterile water control; Phe., phenamacril; Pyd., pydiflumetofen; Teb., tebuconazole; Phe. + Teb., phenamacril + tebuconazole, ratio = 1.74 : 1; Pyd. + Teb., pydiflumetofen + tebuconazole, ratio = 2.76 : 1. Disease incidence was calculated as the percentage of plants with a disease rating ≥ 1 relative to the total number of plants assessed in each treatment.