

SUPPLEMENTAL DOCUMENT

Table S1-S2; Figure S1-S2

Mycoviral Diversity of *Fusarium oxysporum* f. sp. *niveum* in Three Major Watermelon-Production Areas in China

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Table S1. List of primers used in this study.

Name	Sequence (5'to3')	PCR product size	Contig name
FoNNAV1-S1-F	CCGTGGGAATGTTTGTC	962	contig58
FoNNAV1-S1-R	GCGGCAGCTAATGGTAC		
FoNNAV1-S2-F	TTGAGGGAGTTGGAAGT	965	
FoNNAV1-S2-R	CTCGGAGACGATTTGGTA		
FoNMV1-S1-F	TCGCATCCCTGTTGACTGAT	813	contig20
FoNMV1-S1-R	CGAGGGATGTGTGCAATTGT		
FoNMV1-S2-F	TGAAGGGTGAGGTGGAT	938	
FoNMV1-S2-R	AAATGCCGTTGGTAGAA		
FoNMTV1-S1-F	TTTACGACACCAGAGGGTTA	803	contig682
FoNMTV1-S1-R	GTATTATAGACGGCAAGGAA		
FoNMTV1-S2-F	TTCAGCAACAGATAGATTTC	911	
FoNMTV1-S2-R	TCGTATTATAGACGGCAAGG		
FoNMLV1-S1-F	ACATTCGGGTATAAGCCACA	966	contig453
FoNMLV1-S1-R	ATTCCATCCTTTCTCCCTGT		
FoNMLV1-S2-F	CGACCTAAAGGCCGCTAC	916	
FoNMLV1-S2-R	TTGCTGCTCTATTGATCCATAAC		
FoNTV1-S1-F	ATCCATGTAGTTCCACGCCA	834	contig164
FoNTV1-S1-R	ATCCATGTAGTTCCACGCCA		
FoNTV1-S2-F	CTGCGATATGCTCTGGT	811	
FoNTV1-S2-R	CTGTGGTTACGGGTGAA		
FoNCHV2-S1-F	AGACCGTTCGTTGATACTGA	773	contig89
FoNCHV2-S1-R	GCTTTCCCATTTCTTGCTC		
FoNCHV2-S2-F	ATGACCGACCGAAGTAAA	753	
FoNCHV2-S2-R	CGTGGATGCCTTAGCAG		

Note: S1: The first pair of primers; S2: Second pair of primers.

Table S2. Molecular features of the mycoviruses identified in *Fusarium oxysporum* f. sp. *niveum*.

Contig name	Contig length (bp)	Virus name	Virus abbrev	Genome type	Virus family	identity (%)	Best hit	E value	Accession
contig177	3486	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> chrysovirus 1 dsRNA1	FoNCHV1	dsRNA	<i>Chrysoviridae</i>	99.5	<i>Fusarium sacchari</i> chrysovirus 1	0	QIQ28417.1
contig325	2790	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> chrysovirus 1 dsRNA2	FoNCHV1	dsRNA	<i>Chrysoviridae</i>	98.7	<i>Fusarium sacchari</i> chrysovirus 1	0	QIQ28419.1
contig407	2600	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> chrysovirus 1 dsRNA3	FoNCHV1	dsRNA	<i>Chrysoviridae</i>	99.3	<i>Fusarium sacchari</i> chrysovirus 1	0	QIQ28420.1
contig1649	1599	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> chrysovirus 1 dsRNA4	FoNCHV1	dsRNA	<i>Chrysoviridae</i>	94.3	<i>Fusarium sacchari</i> chrysovirus 1	0	QIQ28418.1
contig85	4418	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> chrysovirus 2 dsRNA1	FoNCHV2	dsRNA	<i>Chrysoviridae</i>	55.8	<i>Ilyonectria pseudodestructans</i> chrysovirus 1	2.04E-293	UVD33182.1
contig89	4342	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> chrysovirus 2 dsRNA2	FoNCHV2	dsRNA	<i>Chrysoviridae</i>	46.9	<i>Ilyonectria pseudodestructans</i> chrysovirus 1	1.39E-200	UVD33181.1
contig87	4378	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> chrysovirus 3	FoNCHV3	dsRNA	<i>Chrysoviridae</i>	93.9	<i>Fusarium oxysporum</i> chrysovirus 1	0	YP_009665200.1
contig11809	634	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> chrysovirus 4	FoNCHV4	dsRNA	<i>Chrysoviridae</i>	68.1	<i>Pestalotiopsis theae</i> chrysovirus 1	1.59E-20	QCY49460.1
contig164	3530	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> tick virus 1	FoNTV1	dsRNA	<i>Chrysoviridae</i>	85.4	Nanning Chrys tick virus 1	0	UYL95303.1
contig33373	260	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> Picobirnavirus 1	FoNPV1	dsRNA	<i>Picobirnaviridae</i>	92.6	Picobirnavirus sp.	1.98E-09	UJT31894.1
contig542	2544	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> Hadakavirus 1 dsRNA1	FoNHV1	ssRNA(+)	<i>Hadakaviridae</i>	97	Hadaka virus 1	0	YP_010840281.1
contig766	2297	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> Hadakavirus 1 dsRNA2	FoNHV1	ssRNA(+)	<i>Hadakaviridae</i>	99.3	Hadaka virus 1	0	YP_010840282.1
contig90	4313	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> Hadakavirus 1 dsRNA3	FoNHV1	ssRNA(+)	<i>Hadakaviridae</i>	98.5	Hadaka virus 1	0	YP_010840279.1
contig3627	1350	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> Hadakavirus 1 dsRNA4	FoNHV1	ssRNA(+)	<i>Hadakaviridae</i>	96.5	Hadaka virus 1	7.13E-164	YP_010840280.1
contig5119	1166	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> Hadakavirus 1 dsRNA5	FoNHV1	ssRNA(+)	<i>Hadakaviridae</i>	97	Hadaka virus 1	5.42E-150	YP_010840283.1
contig6291	1062	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> Hadakavirus 1 dsRNA6	FoNHV1	ssRNA(+)	<i>Hadakaviridae</i>	98.4	Hadaka virus 1	2.97E-165	YP_010840284.1
contig7055	1008	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> Hadakavirus 1 dsRNA7	FoNHV1	ssRNA(+)	<i>Hadakaviridae</i>	80.4	Hadaka virus 1	5.04E-76	YP_010840276.1
contig8759	908	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> Hadakavirus 1 dsRNA8	FoNHV1	ssRNA(+)	<i>Hadakaviridae</i>	91.7	Hadaka virus 1	2.00E-37	YP_010840274.1
contig9099	891	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> Hadakavirus 1 dsRNA9	FoNHV1	ssRNA(+)	<i>Hadakaviridae</i>	88.4	Hadaka virus 1	1.71E-91	YP_010840275.1
contig9161	888	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> Hadakavirus 1 dsRNA10	FoNHV1	ssRNA(+)	<i>Hadakaviridae</i>	90.1	Hadaka virus 1	6.72E-94	YP_010840277.1
contig682	2375	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> mitovirus 1	FoNMTV1	ssRNA(+)	<i>Mitoviridae</i>	64.1	<i>Botrytis cinerea</i> mitovirus 8	1.99E-302	QHJ68503.1
contig64489	275	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> mitovirus 2	FoNMTV2	ssRNA(+)	<i>Mitoviridae</i>	50	Henan forest mitovirus 6	8.49E-17	UPW42166.1
contig453	2256	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> mito-like virus 1	FoNMLV1	ssRNA(+)	<i>Mitoviridae</i>	70.5	Henan mito-like virus 31	0	UPW42176.1
contig64917	250	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> mito-like virus 2	FoNMLV2	ssRNA(+)	<i>Mitoviridae</i>	69.1	Xinjiang mito-like virus 58	5.65E-14	UPW42184.1

contig67309	246	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> splipalmivirus 1 RNA1	FoNSV1	ssRNA(+)	<i>Narnaviridae</i>	87.7	Oidiodendron maius splipalmivirus 1	9.67E-40	QNN89180.1
contig63076	253	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> splipalmivirus 1 RNA2	FoNSV1	ssRNA(+)	<i>Narnaviridae</i>	70.4	Oidiodendron maius splipalmivirus 1	1.20E-32	UJT31791.1
contig65881	271	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> namavirus 2	FoNNV2	ssRNA(+)	<i>Narnaviridae</i>	90	Erysiphe necator associated narnavirus 49	9.04E-45	QJT93781.1
contig39542	327	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> Potyvirus 1	FoNPTV1	ssRNA(+)	<i>Potyviridae</i>	99.1	papaya ringspot virus	1.38E-60	KLP21678.1
contig20	7039	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> mymonavirus 1	FoNMV1	ssRNA(-)	<i>Mymonaviridae</i>	73.5	Plasmopara viticola lesion associated mymonavirus 1	0	YP_010798438.1
contig26	6714	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> mymonavirus 2	FoNMV2	ssRNA(-)	<i>Mymonaviridae</i>	29.1	Magnaporthe oryzae mymonavirus 1	1.48E-33	QVU39969.1
contig32	6457	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> mononegavirus1	FoNMGV1	ssRNA(-)	<i>Mymonaviridae</i>	46.2	Plasmopara viticola lesion associated mononegaambi virus 8	0	YP_010798440.1
contig58	5119	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> RNA virus 1	FoNNAV1	ssRNA(-)	-	52.8	Grapevine-associated negative single-stranded RNA virus 1	5.65E-104	QXN75409.1
contig27793	399	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> densovirus 1	FoNDV1	ssDNA(+/-)	<i>Parvoviridae</i>	100	Sitobion miscanthi densovirus	1.90E-36	AWS20450.1
contig44208	307	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> Capripoxvirus 1	FoNCPV1	dsDNA	<i>Poxviridae</i>	100	lumpy skin disease virusvirion core protein (lumpy skin disease virus), partial [Stenotrophomonas maltophilia]	5.28E-54	PTT44258.1
contig69281	248	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> leukemia virus 1	FoNLV1	ssRNA-RT	<i>Retroviridae</i>	100	Murine leukemia virus	1.22E-28	AAA46516.1
contig74422	253	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> Retrovirus 1	FoNRV1	ssRNA-RT	<i>Retroviridae</i>	100	Retrovirus-related Pol polyprotein [Yarrowia lipolytica]	2.27E-45	QNP98380.1
contig61628	282	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> Caulimovirus 1	FoNGV1	dsDNA-RT	<i>Caulimoviridae</i>	97.8	Caulimovirus viroplasm-in-domain-containing protein [Fusarium solani]	1.72E-55	XP_046124817.1
contig425	2570	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> culmorum virus 1	FoNCV1	-	-	84.7	Fusarium culmorum virus 1	0	QIC51517.1
contig4624	951	<i>Fusarium oxysporum</i> f. sp. <i>niveum</i> nama-levi-like virus 1	FoNNLV1	-	-	98.9	XiangYun nama-levi-like virus 3	1.68E-120	UUG74238.1

Figure S1. Growth rate and spore yield of 150 FoN. (a) Growth rate of 150 FoN. Among them, 6 strains grew at a rate less than 0.8 cm per day, indicating abnormal morphology. (b) Spore yield of 150 FoN. Among them, the spore yield of 11 strains was less than 10×10^5 , indicating abnormal morphology.

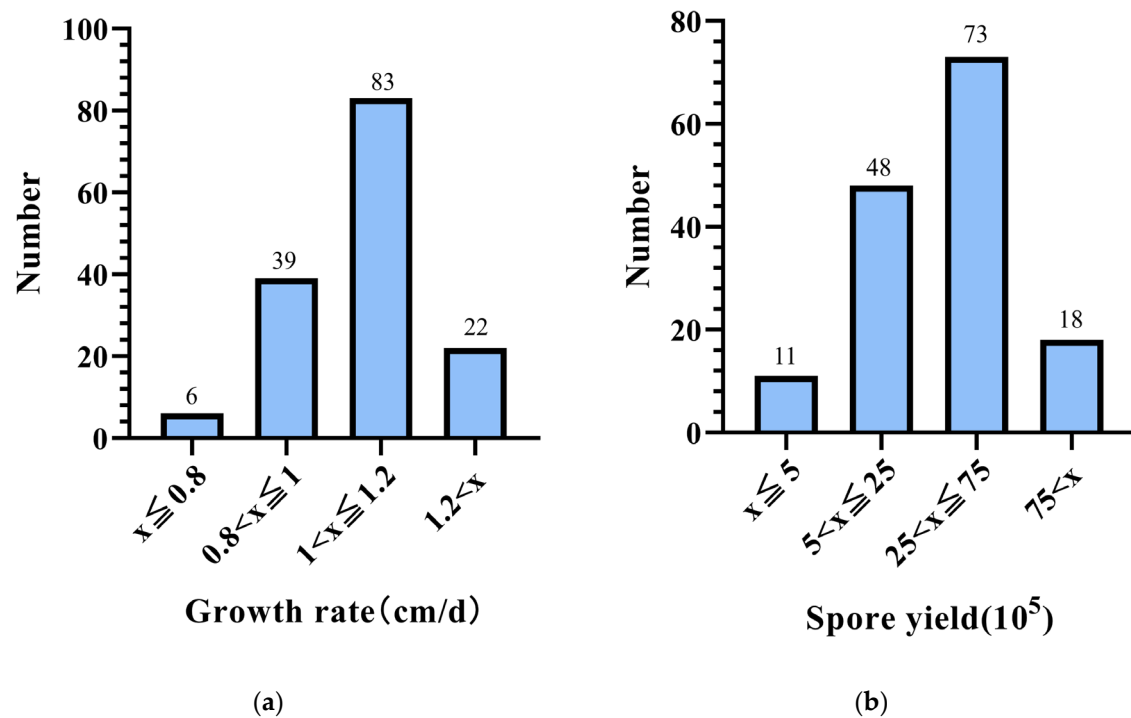


Figure S2. Strains with abnormal pigment production and colony morphology. (a) Strain with normal pigment production. (b-f) Five strains with abnormal pigment production. (G) Strain with normal colony morphology. (h-l) Five strains with abnormal colony morphology.

