

Additional file 2

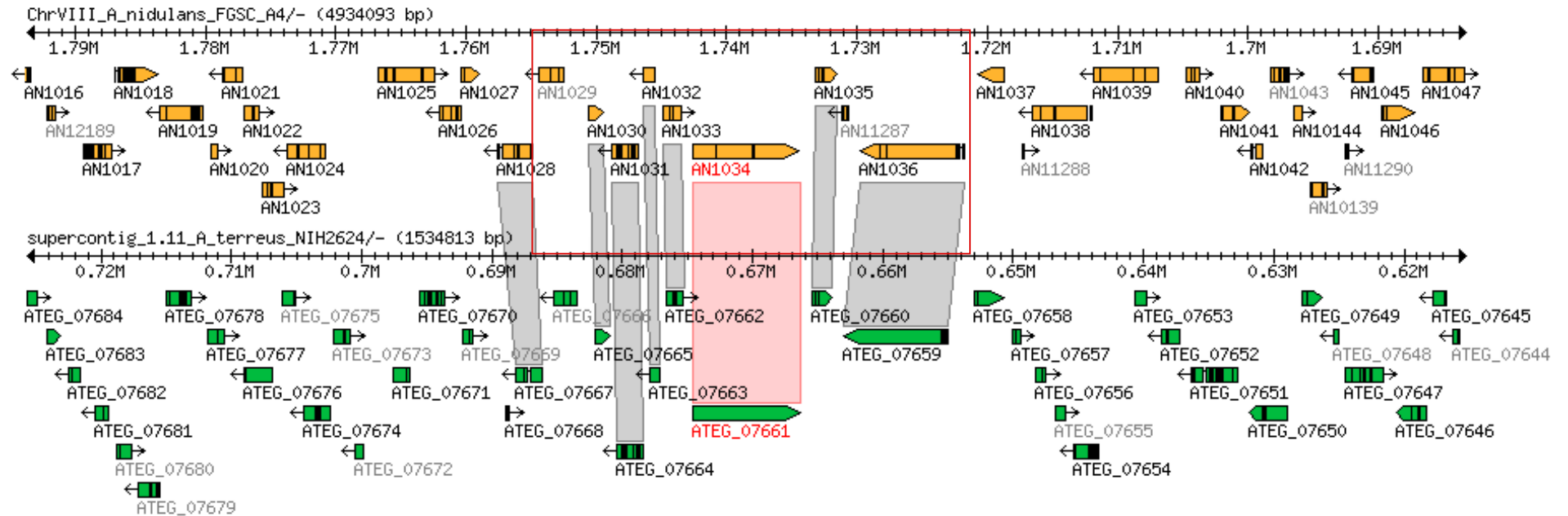
Comprehensive annotation of secondary metabolite biosynthetic genes and gene clusters of *Aspergillus nidulans*, *A. fumigatus*, *A. niger* and *A. oryzae*

Diane O. Inglis, Jon Binkley, Marek Skrzypek, Martha B. Arnaud, Gustavo Cerqueira, Prach Shah, Farrell Wymore, Jennifer R. Wortman and Gavin Sherlock

Abbreviations: ECS, end of cluster syntenly; IGD, increase in intergenic distance; FA, change in functional annotation; ED, experimentally determined, EP, expression profile (data from M. Andersen *et al*, 2013)

Asperfuranone (afo) cluster

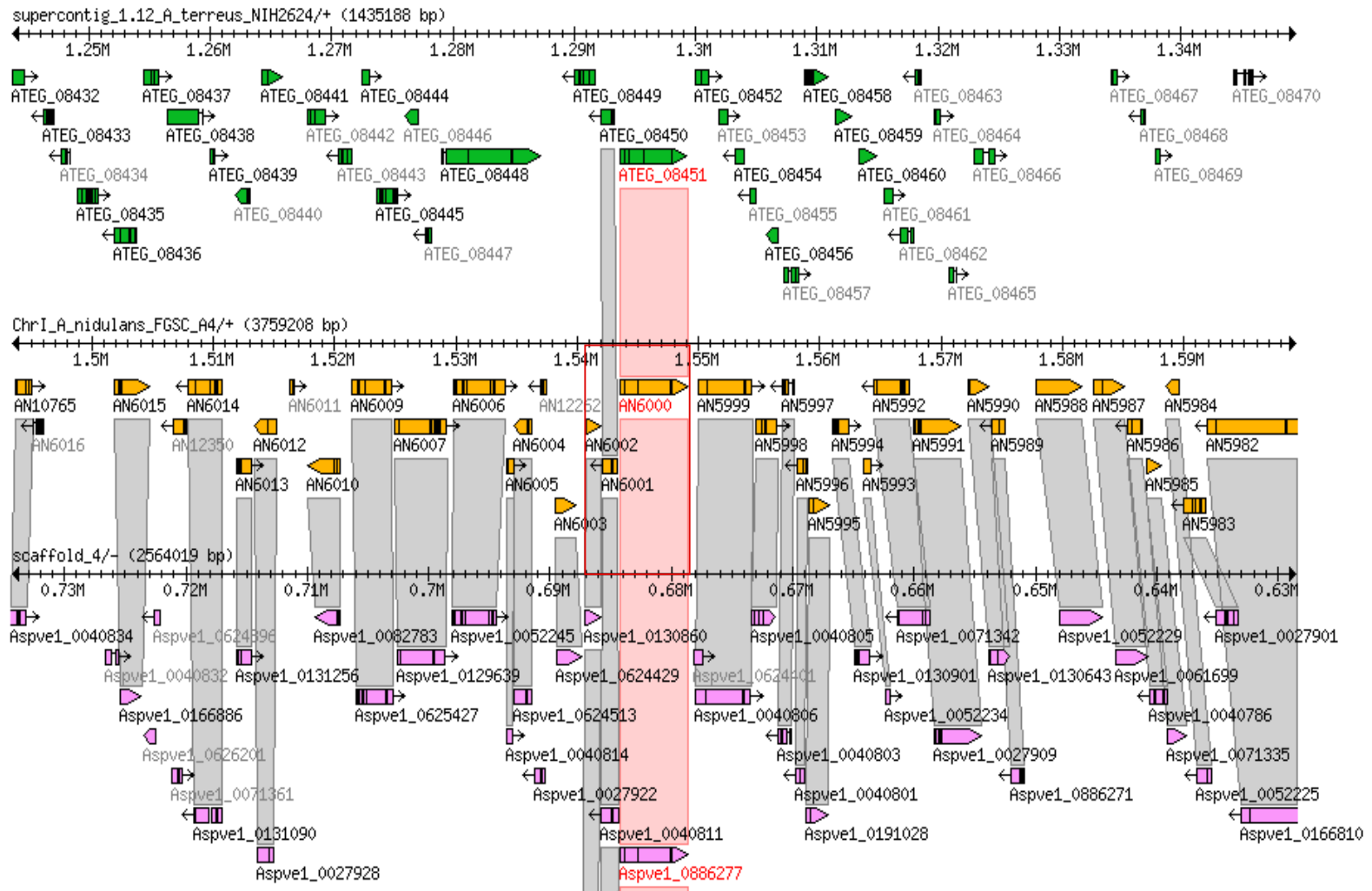
Experimentally determined cluster



Asperfuranone (afo) cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	Note
n/a					Protein of unknown function	prot_ID_1671	AN1026	
n/a					Protein of unknown function	prot_ID_448	AN1027	
n/a					Zn(II)2Cys6 transcription factor	prot_ID_903	AN1028	
AN1029.3	8	1371	conserved hypothetical protein	afoA	Zn(II)2Cys6 domain transcription factor	prot_ID_1382	AN1029	ED
AN1030.3	7	592	conserved hypothetical protein		Oxidoreductase	prot_ID_664	AN1030	
AN1031.3	6	385	conserved hypothetical protein	afoB	Efflux pump	prot_ID_1128	AN1031	
AN1032.3	5	606	hypothetical protein	afoC	Oxidoreductase	prot_ID_1589	AN1032	
AN1033.3	4	850	hypothetical protein	afoD	Salicylate hydroxylase	prot_ID_364	AN1033	
AN1034.3	3	528	polyketide synthase	afoE	Polyketide synthase	prot_ID_820	AN1034	
AN1035.3	2	447	FAD binding domain protein	afoF	FAD/FMN-dependent oxygenase	prot_ID_1293	AN1035	
AN11287.3	1	918	predicted protein		Protein of unknown function	prot_ID_750	AN11287	
AN1036.3	0	0	polyketide synthase hypothetical protein similar to oleate delta-12	afoG	Polyketide synthase	prot_ID_71	AN1036	ED
AN1037.3	-1	1447	desaturase	odeA	Oleate delta-12 desaturase	prot_ID_524	AN1037	
AN11288.3	-2	1245	predicted protein		Protein of unknown function	prot_ID_1221	AN11288	
n/a					Rab guanyl-nucleotide exchange factor	prot_ID_988	AN1038	
n/a					membrane-tethered transcription factor, putative	prot_ID_1462	AN1039	
n/a					Protein of unknown function	prot_ID_739	AN1040	

Asperthecin (apt) cluster

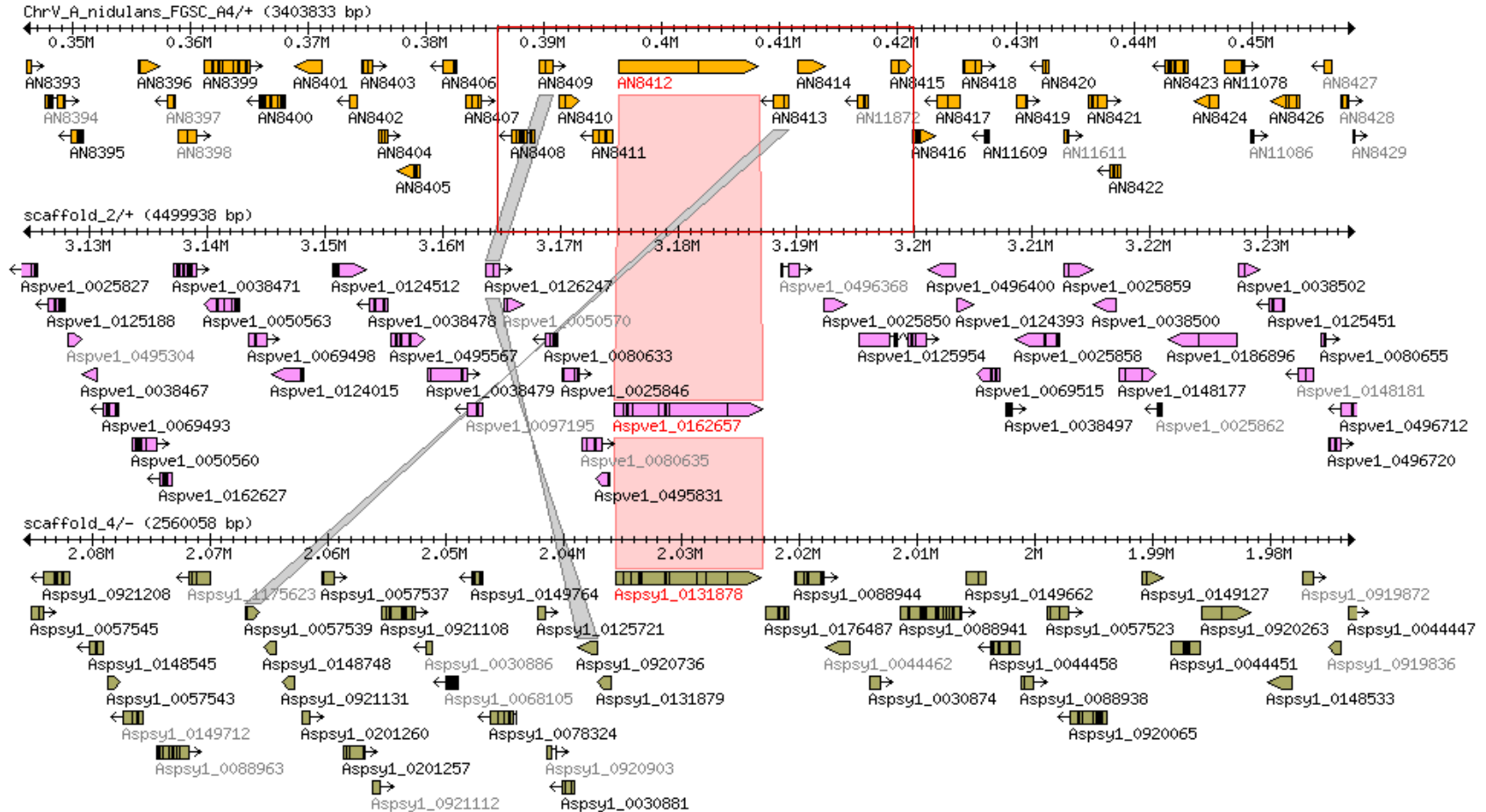


**Asperthecin
(apt)
cluster**

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	Note
AN5989.3	11	113	conserved hypothetical protein		NAD dependent epimerase/dehydratase	n/a	AN5989	
AN5990.3	10	662	conserved hypothetical protein		Long-chain-fatty-acid-CoA ligase	n/a	AN5990	
AN5991.3	9	400	conserved hypothetical protein	pexA	long-chain-fatty-acid-CoA ligase	prot_ID_370	AN5991	
AN5992.3	8	466	conserved hypothetical protein		DNA replication licensing factor	Mcm7 prot_ID_1055	AN5992	
AN5993.3	7	1156	hypothetical protein		Putative adhesion	prot_ID_490	AN5993	
AN5994.3	6	258	conserved hypothetical protein		ATP-dependent NAD(P)H-hydrate dehydratase	prot_ID_1176	AN5994	
AN5995.3	5	242	hypothetical protein		Protein of unknown function	prot_ID_616	AN5995	
AN5996.3	4	96	hypothetical protein		60S acidic ribosomal protein P2	prot_ID_53	AN5996	
AN5997.3	3	395	40S ribosomal protein S15		40S ribosomal protein S15	prot_ID_736	AN5997	
AN5998.3	2	482	conserved hypothetical protein		SET and MYND domain protein	prot_ID_169	AN5998	
AN5999.3	1	1256	conserved hypothetical protein		Carbamoyl-phosphate synthase, large subunit	prot_ID_856	AN5999	
AN6000.3	0	0	polyketide synthase	aptA	Polyketide synthase	prot_ID_873	AN6000	ED
AN6001.3	-1	433	conserved hypothetical protein	aptB	Hydrolase	prot_ID_303	AN6001	
AN6002.3	-2	146	conserved hypothetical protein	aptC	Monooxygenase	prot_ID_991	AN6002	ED
AN6003.3	-3	803	conserved hypothetical protein		Protein of unknown function	prot_ID_428	AN6003	
n/a					Protein of unknown function	prot_ID_1284	AN12262	
AN6004.3	-4	1947	conserved hypothetical protein		actin cytoskeleton protein	prot_ID_1114	AN6004	
AN6005.3	-5	81	conserved hypothetical protein		Protein of unknown function	prot_ID_554	AN6005	
AN6006.3	-6	920	conserved hypothetical protein	kapD	Karyopherin	prot_ID_1235	AN6006	
AN6007.3	-7	547	conserved hypothetical protein		ATP binding, ATP-dependent helicase	prot_ID_676	AN6007	
n/a					AN6008 was merged into AN6009	prot_ID_793	AN6009	

Aspyridone (asp) cluster

Experimentally determined cluster

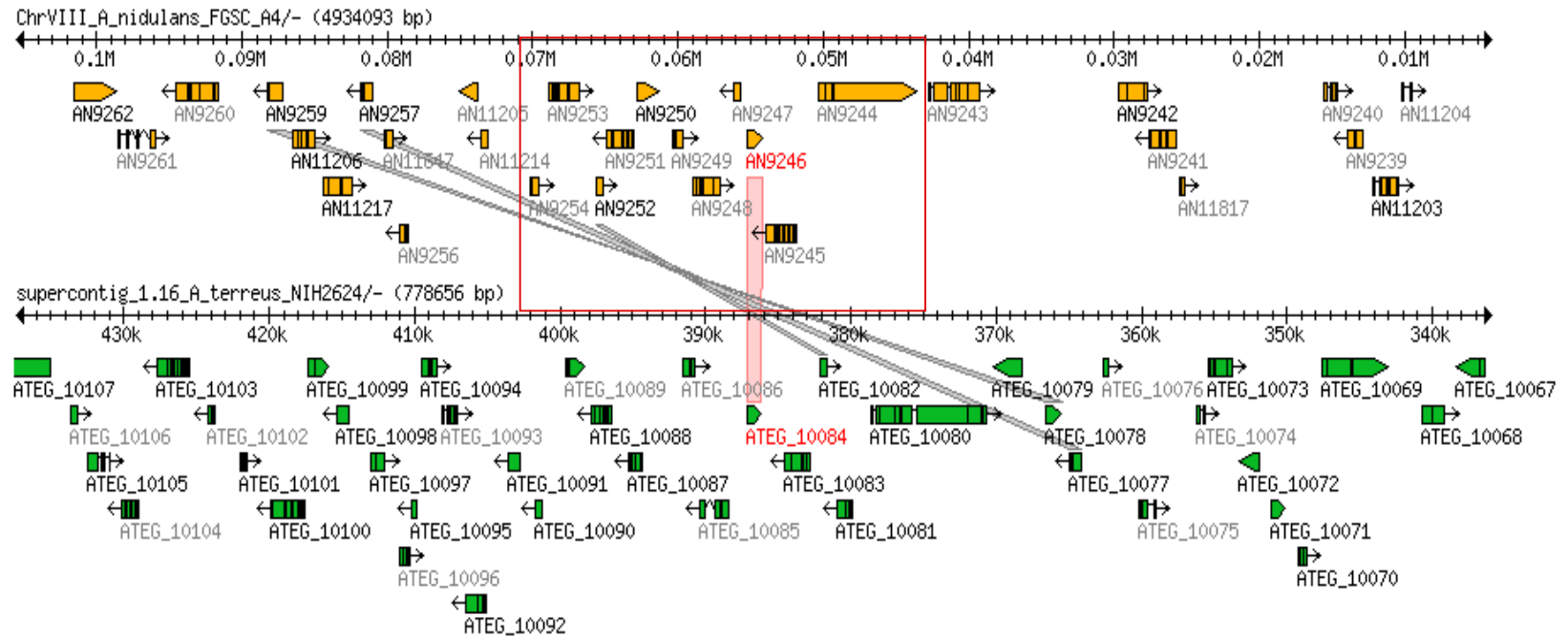


Aspyridone (asp) cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	Note
AN8398.3	15	519	conserved hypothetical protein		Oxidoreductase	n/a	AN8398	
AN8399.3	14	917	conserved hypothetical protein		Potassium-transporting ATPase	n/a	AN8399	
AN8400.3	13	749	conserved hypothetical protein		Sugar transporter	n/a	AN8400	
AN8401.3	12	2428	conserved hypothetical protein		Alpha-N-arabinofuranosidase	n/a	AN8401	
AN8402.3	11	414	conserved hypothetical protein		Protein of unknown function	n/a	AN8402	
AN8403.3	10	441	conserved hypothetical protein		Oxidoreductase	n/a	AN8403	
AN8404.3	9	466	conserved hypothetical protein		Protease inhibitor	prot_ID_1032	AN8404	
AN8405.3	8	1805	conserved hypothetical protein		Monooxygenase	prot_ID_572	AN8405	
AN8406.3	7	873	conserved hypothetical protein		Alcohol dehydrogenase	prot_ID_105	AN8406	
AN8407.3	6	1841	conserved hypothetical protein		Protein of unknown function	prot_ID_676	AN8407	
AN11607.3	5	365	predicted protein cytochrome P450		Protein of unknown function			
AN8408.3	4	367	oxidoreductase	apdB	cytochrome P450	prot_ID_206	AN8408	ED
AN8409.3	3	203	conserved hypothetical protein	apdC	enoyl reductase	prot_ID_776	AN8409	
AN8410.3	2	1116	conserved hypothetical protein	apdD	FAD-dependent monooxygenase	prot_ID_931	AN8410	
AN8411.3	1	476	hypothetical protein	apdE	Cytochrome P450 monooxygenase Hybrid polyketide synthase- nonribosomal peptide synthase (PKS- NRPS)	prot_ID_476	AN8411	
AN8412.3	0	0	hybrid PKS-NRPS	apdA		prot_ID_1031	AN8412	
AN8413.3	-1	284	conserved hypothetical protein	apdF	Exporter	prot_ID_571	AN8413	
AN8414.3	-2	826	conserved hypothetical protein	apdR	Zn(II)2Cys6 transcription factor	prot_ID_104	AN8414	
AN11608.3	-3	1963	predicted protein		Protein of unknown function	prot_ID_1041	AN11872	
AN8415.3	-4	3186	conserved hypothetical protein	apdG	Acyl-coA dehydrogenase	prot_ID_675	AN8415	ED
n/a				furE	Transporter	prot_ID_204	AN8416	
n/a					Hydrolase	prot_ID_774	AN8417	
n/a					Hydrolase	prot_ID_306	AN8418	
n/a						prot_ID_905	AN11609	

Austinol (aus) cluster 1

Experimentally determined cluster

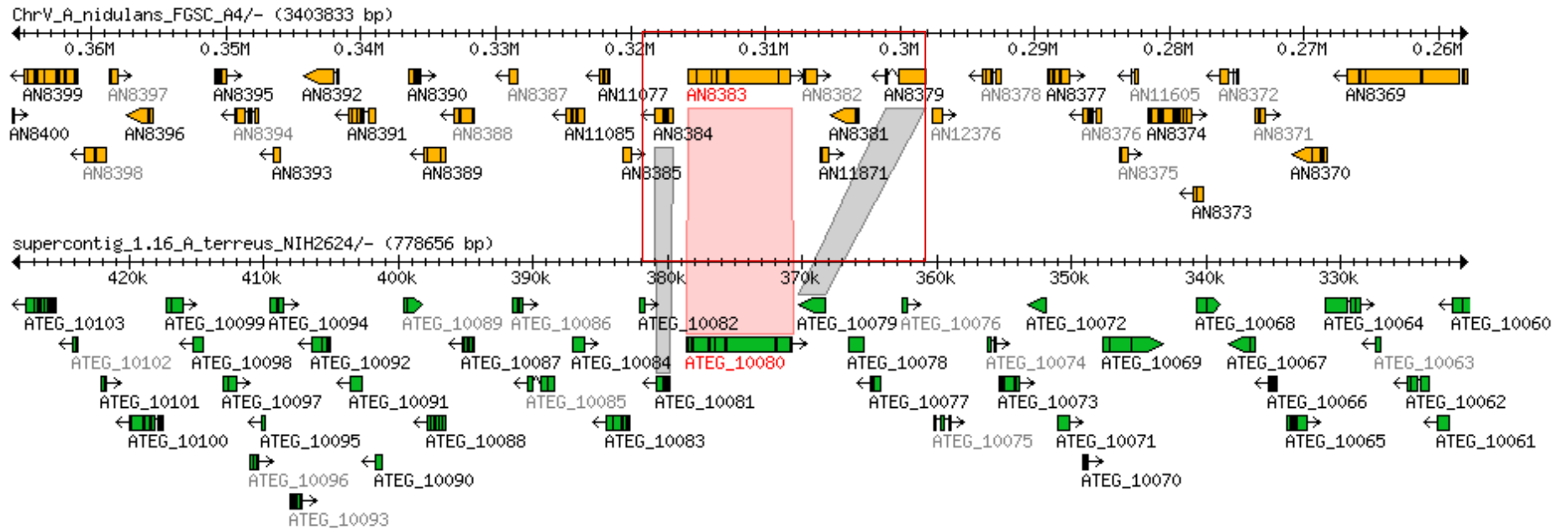


Austinol (aus) AN9244 cluster

Gene id (SMURF)*	Gene positions	Gene distance (SMURF)	Annotated_gene_function	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	prot_ID_1713	AN11817	
n/a					Protein of unknown function	prot_ID_1399	AN9241	
n/a					Protein of unknown function	prot_ID_168	AN9242	
AN9243.3	1	965	NRPS-like enzyme nonribosomal peptide synthase		Protein of unknown function	prot_ID_625	AN9243	
AN9244.3	0	0			Nonribosomal peptide synthase 3-oxoacyl-[acyl-carrier-protein] reductase	prot_ID_1091	AN9244	ED, FA
AN9245.3	-1	1507	fatty acid synthase			prot_ID_1559	AN9245	
AN9246.3	-2	328	conserved hypothetical protein	ausE	Dioxygenase	prot_ID_332	AN9246	
AN9247.3	-3	361	conserved hypothetical protein	ausF	Protein of unknown function	prot_ID_787	AN9247	
AN9248.3	-4	983	conserved hypothetical protein	(ausG)	CYP650B1 Cytochrome P450	prot_ID_1263	AN9248	
AN9249.3	-5	587	conserved hypothetical protein	ausH	Protein of unknown function	prot_ID_39	AN9249	
AN9250.3	-6	918	conserved hypothetical protein		O-acetyltransferase	prot_ID_1006	AN9250	
AN9251.3	-7	209	conserved hypothetical protein	CYP650A1	Cytochrome P450	prot_ID_1479	AN9251	
n/a					Protein of unknown function	prot_ID_254	AN9252	
n/a				CYP651A1 (ausI)	Cytochrome P450	prot_ID_706	AN9253	ED
n/a					Protein of unknown function	prot_ID_1176	AN9254	

Austinol (aus) cluster 2

Experimentally determined cluster

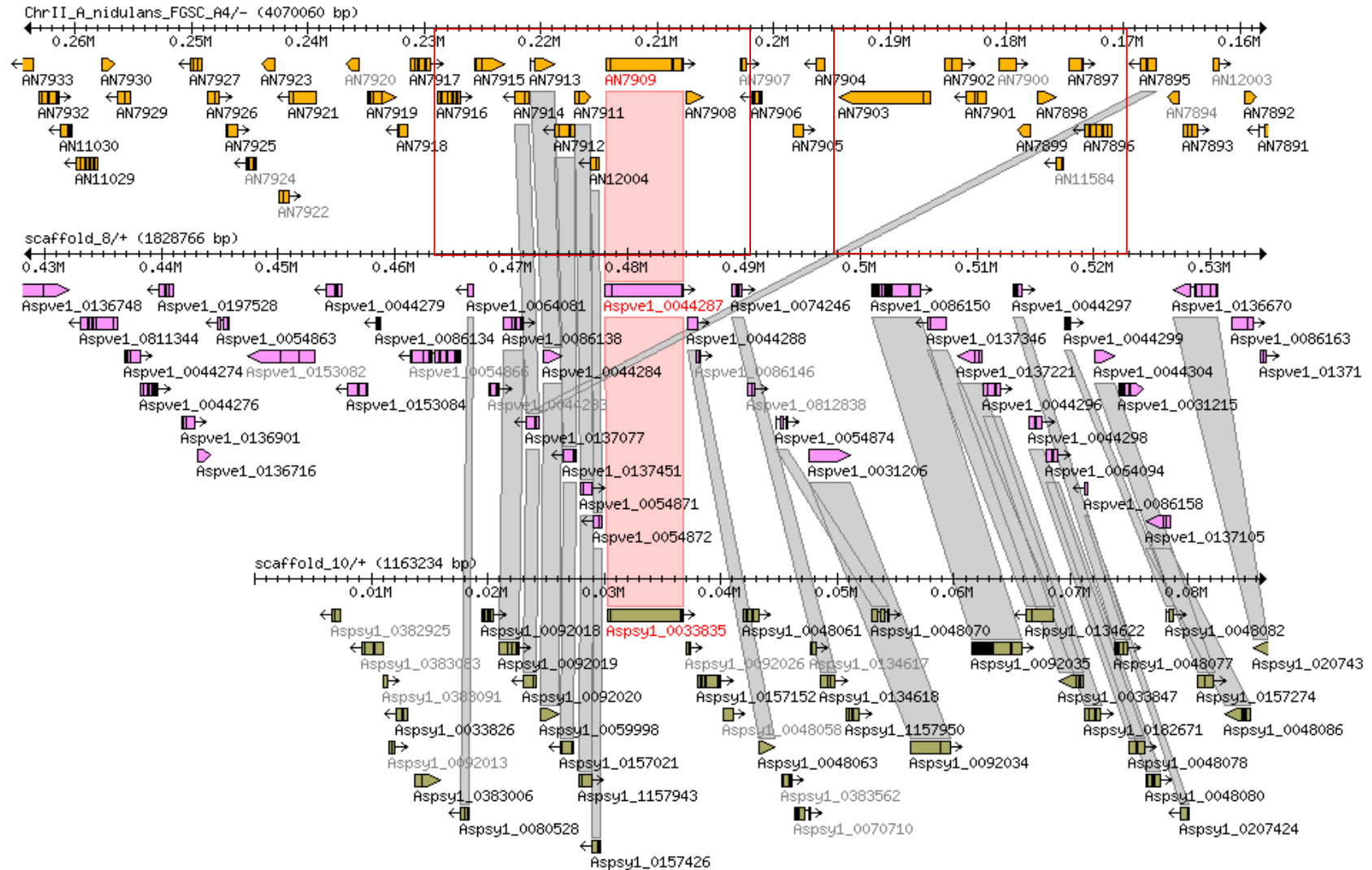


Austinol (aus) cluster

Gene id (SMURF)*	Gene positions	Gene distance (SMURF)	Annotated_gene_function	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Myb-like transcription factor	prot_ID_161	AN8377	
n/a					Monoxygenase	prot_ID_734	AN8378	
n/a					Oxidoreductase	prot_ID_1052	AN12376	
n/a				ausB	Oxidoreductase	prot_ID_267	AN8379	ED, ECS
n/a				ausC	Protein of unknown function	prot_ID_995	AN8381	
n/a					Protein of unknown function	prot_ID_1056	AN11871	
AN8382.3	1	906	hypothetical protein		Protein of unknown function	prot_ID_540	AN8382	
AN8383.3	0	0	polyketide synthase	ausA	Polyketide synthase	prot_ID_62	AN8383	
AN8384.3	-1	1159	conserved hypothetical protein	ausD	Protein of unknown function	prot_ID_635	AN8384	ED, ECS
AN8385.3	-2	1832	conserved hypothetical protein		Protein of unknown function	prot_ID_159	AN8385	
AN11077.3	-3	955	conserved hypothetical protein		Acetyltransferase	prot_ID_519	AN11077	
AN11085.3	-4	1315	conserved hypothetical protein		D-arabinitol 4-dehydrogenase	prot_ID_518	AN11085	
AN8387.3	-5	3635	conserved hypothetical protein		Protein of unknown function	prot_ID_263	AN8387	
AN8388.3	-6	2608	conserved hypothetical protein		Protein of unknown function	prot_ID_833	AN8388	
AN8389.3	-7	673	conserved hypothetical protein		Predicted acid phosphatase	prot_ID_366	AN8389	
AN8390.3	-8	149	conserved hypothetical protein		GPR1/FUN34/YaaH family member	prot_ID_538	AN8390	
AN8391.3	-9	2505	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	n/a	AN8391	
AN8392.3	-10	840	conserved hypothetical protein		Alpha-glycosidase	n/a	AN8392	
AN8393.3	-11	1834	conserved hypothetical protein		Protein of unknown function	n/a	AN8393	
AN8394.3	-12	1349	conserved hypothetical protein		Transmembrane transporter	n/a	AN8394	
AN8395.3	-13	328	conserved hypothetical protein		Peroxidase	n/a	AN8395	

Combined Derivative of BenzAldehyde1 (dba) and F9775 clusters 1 and 2

Experimentally determined cluster



Combined Derivative of BenzAldehyde1 (dba) and F9775 clusters

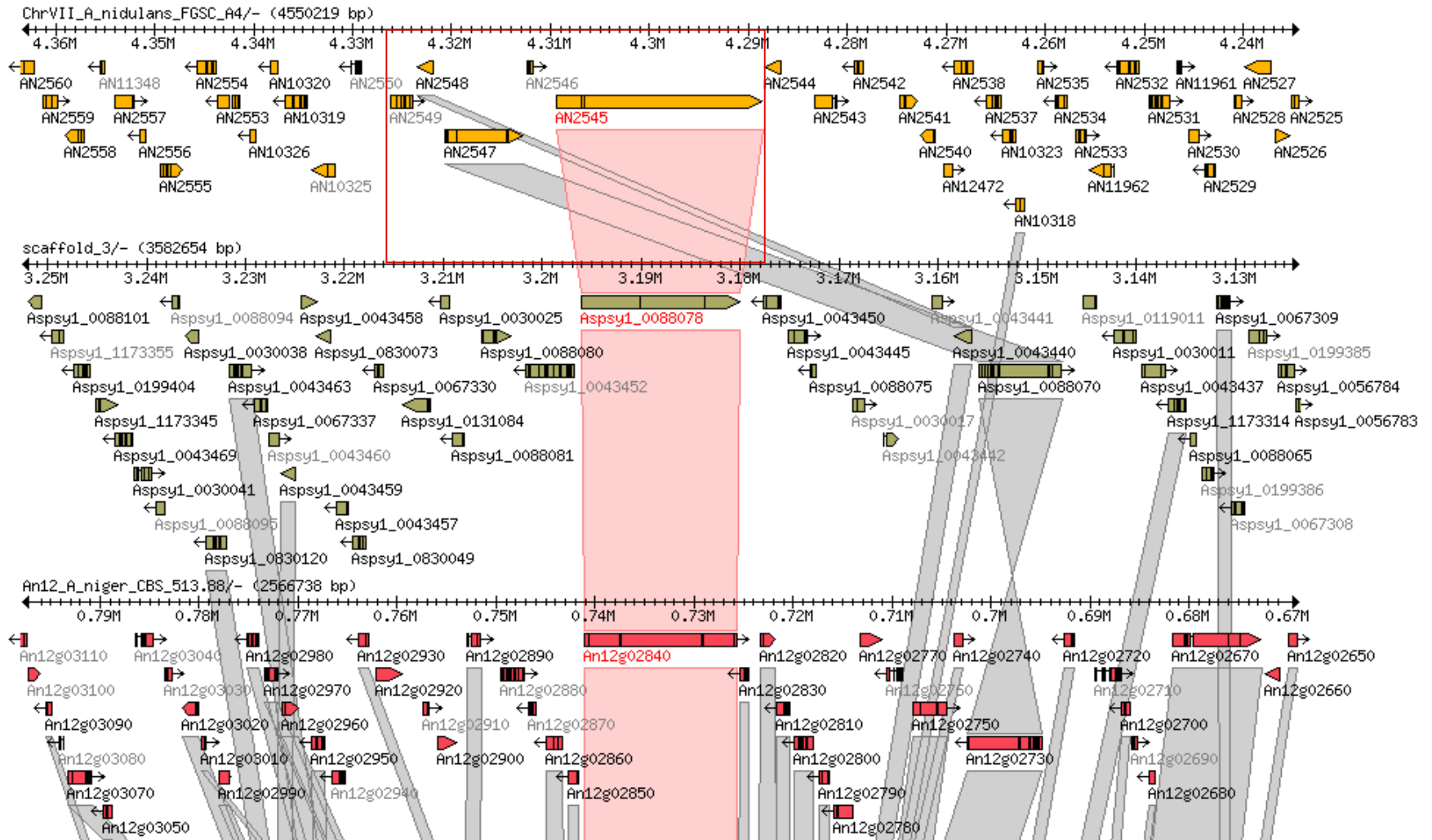
Gene id (SMURF)*	Gene positions	Gene distance (SMURF)	Annotated_gene_function	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a				cipB	oxidoreductase	prot_ID_1082	AN7895	
n/a				dbaA	Zn(II)2Cys6 transcription factor	prot_ID_465	AN7896	ED, cluster 1
n/a				dbaB	FAD-binding monooxygenase	prot_ID_1211	AN7897	
n/a				dbaC	YCII domain protein	prot_ID_983	AN11584	
n/a				dbaD	MFS transporter	prot_ID_594	AN7898	
n/a				dbaE	Esterase/lipase	prot_ID_1344	AN7899	
n/a				dbaF	Oxidoreductase	prot_ID_475	AN7900	
n/a				dbaG	C6 transcription factor	prot_ID_1221	AN7901	
n/a				dbaH	FAD-binding monooxygenase	prot_ID_605	AN7902	
n/a				pkeA/dbaI	Polyketide synthase	prot_ID_5	AN7903	ED, EP, cluster 1
n/a					S-adenosylmethionine-dependent methyltransferase	prot_ID_735	AN7904	
AN7905.3	4	2662	conserved hypothetical protein		Phosphogluconate dehydrogenase	prot_ID_127	AN7905	
AN7906.3	3	461	conserved hypothetical protein		Protein of unknown function	prot_ID_867	AN7906	
AN7907.3	2	3221	conserved hypothetical protein		Glyoxylate-bleomycin resistance protein, F9775 secondary metabolite gene cluster	prot_ID_257	AN7907	ED, cluster 2
AN7908.3	1	267	conserved hypothetical protein		Type II fatty acid synthase, F9775 secondary metabolite gene cluster	prot_ID_1005	AN7908	
AN7909.3	0	0	polyketide synthase	orsA	Polyketide synthase, F9775 secondary metabolite gene cluster	prot_ID_387	AN7909	
n/a					Protein of unknown function, F9775 secondary metabolite gene cluster	prot_ID_1413	AN12004	
AN7911.3	-1	1512	conserved hypothetical protein	orsB	Amidohydrolase, F9775 secondary metabolite gene cluster	prot_ID_4	AN7911	
AN7912.3	-2	358	conserved hypothetical protein	orsC	Tyrosinase, F9775 secondary metabolite gene cluster	prot_ID_733	AN7912	
AN7913.3	-3	521	conserved hypothetical protein		Protein of unknown function	prot_ID_126	AN7913	
AN7914.3	-4	427	conserved hypothetical protein		Alcohol dehydrogenase, F9775 secondary metabolite gene cluster	prot_ID_865	AN7914	
AN7915.3	-5	909	conserved hypothetical protein		Glucosidase, F9775 secondary metabolite gene cluster	prot_ID_254	AN7915	

AN7916.3	-6	1240	conserved hypothetical protein	Amino acid transporter, F9775	prot_ID_1003	AN7916	ED, cluster 2
AN7917.3	-7	614	conserved hypothetical protein	secondary metabolite gene cluster	prot_ID_385	AN7917	
AN7918.3	-8	502	conserved hypothetical protein	oxidoreductase	prot_ID_1134	AN7918	
AN7919.3	-9	40	conserved hypothetical protein	Protein of unknown function	prot_ID_519	AN7919	
AN7920.3	-10	632	conserved hypothetical protein	Zn(II)2Cys6 transcription factor	n/a	AN7920	
AN7921.3	-11	2656	conserved hypothetical protein	Hydrolase	n/a	AN7921	
AN7922.3	-12	217	conserved hypothetical protein	Zn(II)2Cys6 transcription factor	n/a	AN7922	
AN7923.3	-13	318	conserved hypothetical protein	Riboflavin reductase	n/a	AN7923	
				Zn(II)2Cys6 transcription factor	n/a		

Emericellamide (eas) cluster

Experimentally characterized cluster

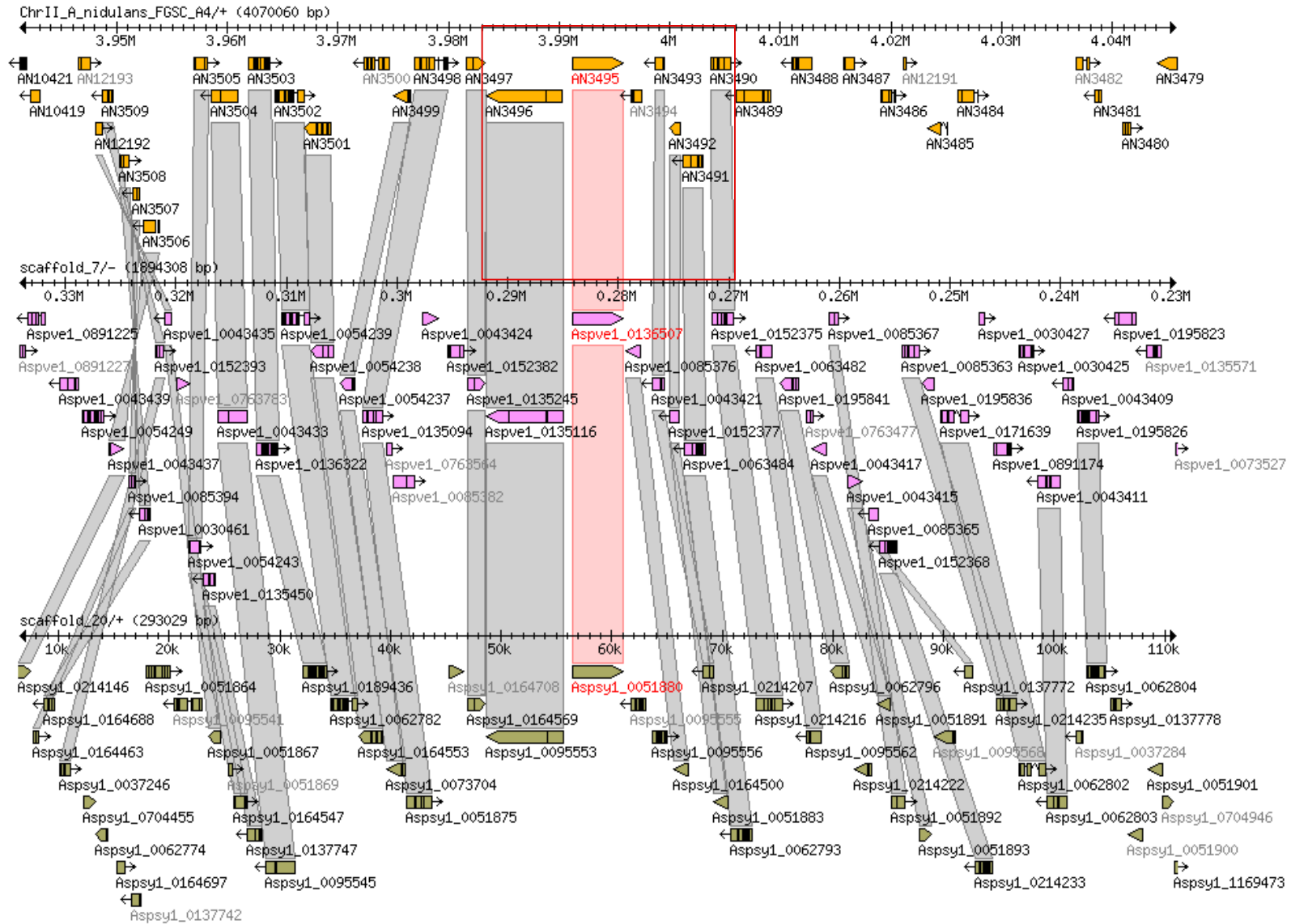
AN2546 - uncharacterized cluster member



Emericellamide (eas) cluster

Gene id (SMURF)*	Gene positions	Gene distance (SMURF)	Annotated_gene_function	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	prot_ID_306	AN2538	
n/a					AN2539 and AN9518 were merged (and consequently deleted) to create AN12472	prot_ID_1583	AN2539	
n/a					Hydrolase		AN12472	
n/a					Protein of unknown function	prot_ID_1360	AN2540	
n/a					Alpha-N-arabinofuranosidase	prot_ID_690	AN2541	
n/a					Pectate lyase	prot_ID_22	AN2542	
n/a				plyD	Rhamnogalacturonan lyase	prot_ID_836	AN2543	
AN2544.3	3	140	conserved hypothetical protein nonribosomal peptide synthase		Transmembrane transporter	prot_ID_161	AN2544	
AN2545.3	2	2252		easA	Nonribosomal peptide synthetase	prot_ID_980	AN2545	ED
AN2546.3	1	699	hypothetical protein		Glycosylphosphatidylinositol (GPI)-anchored protein	prot_ID_304	AN2546	
AN2547.3	0	0	polyketide synthase	easB	Polyketide synthase	prot_ID_1120	AN2547	
AN2548.3	-1	957	conserved hypothetical protein	easC	Acyltransferase	prot_ID_452	AN2548	
AN2549.3	-2	473	conserved hypothetical protein	easD	Acyl-CoA ligase	prot_ID_1260	AN2549	ED
AN2550.3	-3	3294	conserved hypothetical protein		Protein of unknown function	prot_ID_21	AN2550	
AN10325.3	-4	1645	conserved hypothetical protein		Tyrosine kinase	prot_ID_212	AN10325	
AN10319.3	-5	530	conserved hypothetical protein		Transmembrane transporter	prot_ID_365	AN10319	
AN10320.3	-6	1169	conserved hypothetical protein		Protein of unknown function	prot_ID_597	AN10320	
AN10326.3	-7	1474	conserved hypothetical protein		Protein of unknown function	prot_ID_1033	AN10326	
AN2553.3	-8	901	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	n/a	AN2553	

inp cluster

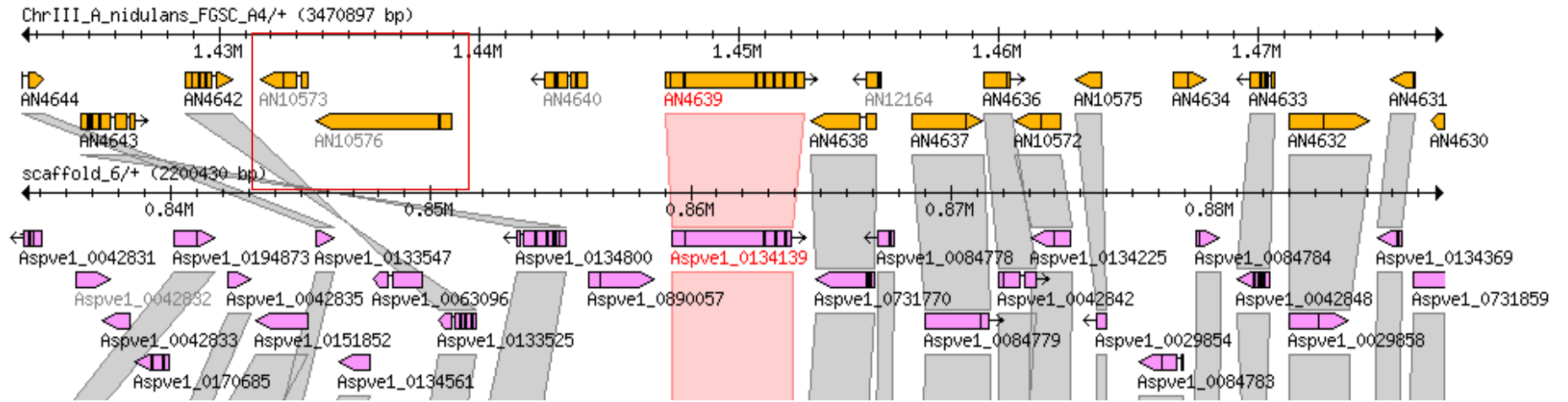


**inp
cluster**

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	n/a	AN3484	
n/a					Protein of unknown function	prot_ID_160	AN3485	
n/a					Protein of unknown function	prot_ID_1441	AN12191	
n/a					Protein of unknown function	prot_ID_899	AN3486	
n/a					Protein of unknown function	prot_ID_286	AN3487	
n/a					N,N-dimethylaniline monooxygenase	prot_ID_1033	AN3488	
n/a					Ortholog(s) have endoplasmic reticulum localization	prot_ID_415	AN3489	
n/a					Protein of unknown function	prot_ID_633	AN3490	EP
AN3491.3	5	403	conserved hypothetical protein	scpR	Transmembrane transporter	prot_ID_33	AN3491	
AN3492.3	4	618	conserved hypothetical protein		C2H2 type zinc finger transcription factor	prot_ID_765	AN3492	
AN3493.3	3	1307	conserved hypothetical protein		Threonine-type endopeptidase	prot_ID_157	AN3493	
AN3494.3	2	233	conserved hypothetical protein		Protein of unknown function	prot_ID_898	AN3494	
AN3495.3	1	834	NRPS-like enzyme	inpA	Nonribosomal peptide synthetase	prot_ID_285	AN3495	
AN3496.3	0	0	nonribosomal peptide synthase, putative conserved hypothetical protein	inpB	Nonribosomal peptide synthetase	prot_ID_1032	AN3496	EP
AN3497.3	-1	27	conserved hypothetical protein	CYP623B2	Cytochrome P450	prot_ID_414	AN3497	
AN3498.3	-2	1672	conserved hypothetical protein		Substrate-specific transmembrane transporter	prot_ID_1159	AN3498	
AN3499.3	-3	432	conserved hypothetical protein		Phosphotransferase	prot_ID_547	AN3499	
AN3500.3	-4	280	conserved hypothetical protein		RNA-directed DNA polymerase	prot_ID_1046	AN3500	
AN3501.3	-5	281	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	prot_ID_427	AN3501	
AN3502.3	-6	149	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	prot_ID_1173	AN3502	
AN3503.3	-7	349	conserved hypothetical protein		Transmembrane transporter	prot_ID_558	AN3503	

AN3504.3	-8	786	conserved hypothetical protein	Alpha-1,4-glucosidase	n/a	AN3504
AN3505.3	-9	306	conserved hypothetical protein	D-alanine-D-alanine ligase	n/a	AN3505
AN3506.3	-10	3177	conserved hypothetical protein	Zn(II)2Cys6 transcription factor	n/a	AN3506

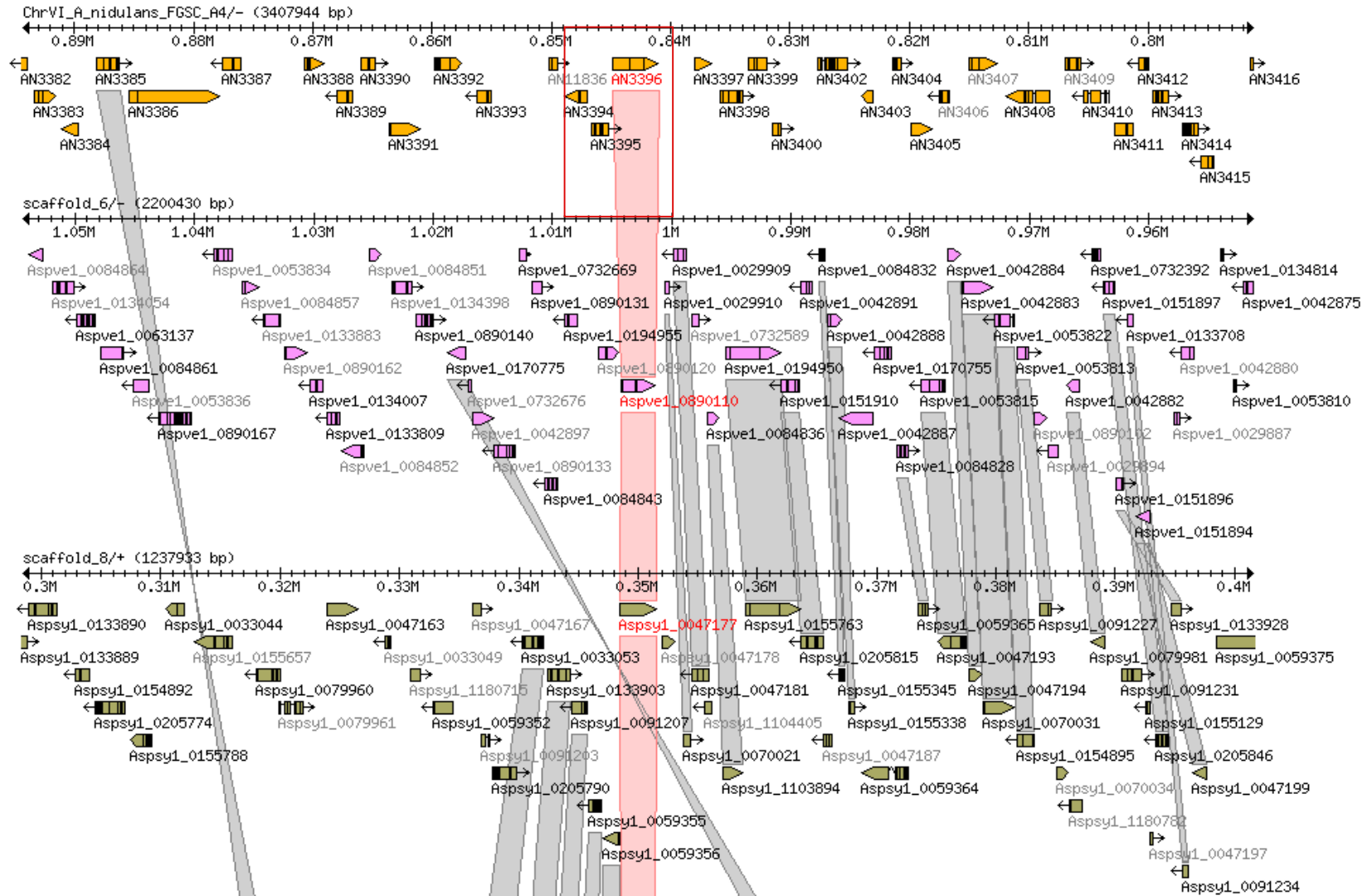
ivo cluster



ivo cluster

Gene id (SMURF)*	Gene positions	Gene distance (SMURF)	Annotated_gene_function	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID
n/a					PA and RING finger domain protein	prot_ID_334	AN4637
n/a					Protein of unknown function	prot_ID_1259	AN12164
n/a					Protein of unknown function	prot_ID_974	AN4638
n/a					TORC1 growth control complex subunit	prot_ID_449	AN4639
n/a					tRNA-Met(CAU)4	n/a	tM(CAU)4
n/a					Transmembrane transporter	prot_ID_630	AN4640
AN10576.3	0	0	nonribosomal peptide synthase	ivoA	One module NRPS; conidiophore pigmentation	prot_ID_570	AN10576 EP
AN10573.3	-1	376	conserved hypothetical protein	ivoC	Cytochrome P450	prot_ID_982	AN10573 EP
AN4642.3	-2	1170	hypothetical protein		Protein of unknown function	prot_ID_739	AN4642
AN4643.3	-3	2097	conserved hypothetical protein	CYP675A1	Cytochrome P450	prot_ID_221	AN4643
AN4644.3	-4	1432	conserved hypothetical protein	CYP675A1	Cytochrome P450	prot_ID_853	AN4644
AN4645.3	-5	1993	conserved hypothetical protein		Protein of unknown function	prot_ID_333	AN4645
AN4646.3	-6	1	hypothetical protein		Protein of unknown function	prot_ID_973	AN4646
AN4647.3	-7	407	conserved hypothetical protein		Protein of unknown function	prot_ID_448	AN4647
AN4648.3	-8	59	conserved hypothetical protein		small nucleolar ribonucleoprotein complex subunit	prot_ID_1086	AN4648
AN4649.3	-9	806	conserved hypothetical protein		Protein of unknown function	prot_ID_561	AN4649

Microperforanone cluster

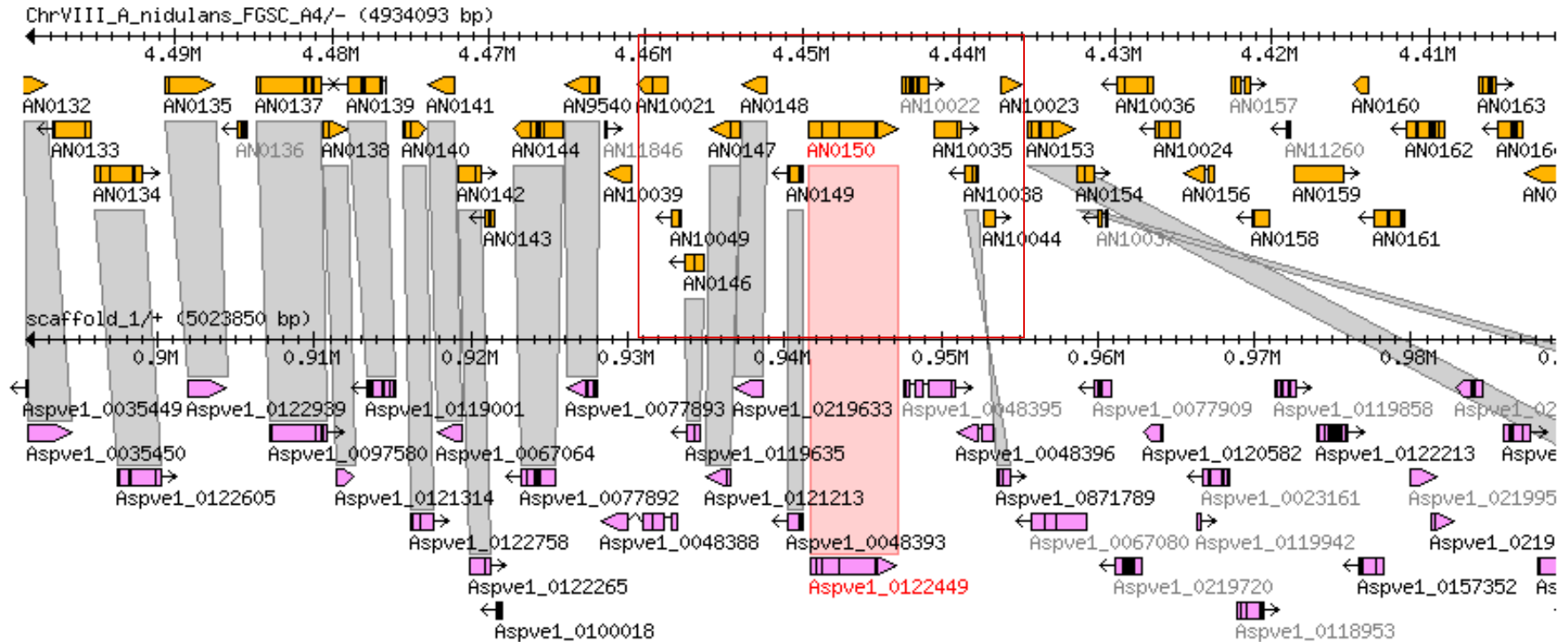


Microperfurane cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
AN3391.3	6	1039	conserved hypothetical protein		C2H2 and Zn(2)-Cys(6) DNA binding transcription factor	prot_ID_954	AN3391	
AN3392.3	5	1186	conserved hypothetical protein		Monoxygenase	prot_ID_455	AN3392	
AN3393.3	4	3751	hypothetical protein	pepI	Neutral metalloprotease II	prot_ID_1062	AN3393	
AN11393.3	3	2130	predicted protein		Protein of unknown function Cytochrome P450; putative O-methylsterigmatocystin oxidoreductase	prot_ID_1120	AN11836	
AN3394.3	2	434	conserved hypothetical protein	CYP620D1	oxidoreductase	prot_ID_553	AN3394	EP
AN3395.3	1	1001	conserved hypothetical protein		Protein of unknown function	prot_ID_67	AN3395	
AN3396.3	0	0	NRPS-like enzyme	micA	Non-ribosomal peptide synthase	prot_ID_663	AN3396	EP
AN11394.3	-1	250	predicted protein		Protein of unknown function			
AN3397.3	-2	2778	conserved hypothetical protein		Protein of unknown function	prot_ID_174	AN3397	
AN3398.3	-3	698	hypothetical protein		Transmembrane transporter UDP-N-acetylmuramate dehydrogenase	prot_ID_768	AN3398	
AN3399.3	-4	520	conserved hypothetical protein		Tetrahydroxynaphthalene reductase	prot_ID_275	AN3399	
AN3400.3	-5	334	conserved hypothetical protein		Deleted ORF; DDE1 transposon-related ORF	prot_ID_668	AN3400	
AN3401.3	-6	665	conserved hypothetical protein				x	
AN3402.3	-7	1647	hypothetical protein similar to alpha-amylase		Alpha-amylase	prot_ID_774	AN3402	
AN3403.3	-8	1076	conserved hypothetical protein		Protein of unknown function	prot_ID_280	AN3403	
AN3404.3	-9	1667	conserved hypothetical protein		Glycosylphosphatidylinositol (GPI)-anchored protein	prot_ID_885	AN3404	
AN3405.3	-10	773	conserved hypothetical protein		Protein of unknown function	n/a	AN3405	
AN3406.3	-11	703	hypothetical protein		Protein of unknown function	n/a	AN3406	
AN3407.3	-12	1627	conserved hypothetical protein		Serine-type endopeptidase	n/a	AN3407	
AN3408.3	-13	1234	conserved hypothetical protein		Dipeptide transporter	n/a	AN3408	

Monodictyphenone (mdp) cluster

Experimentally determined cluster

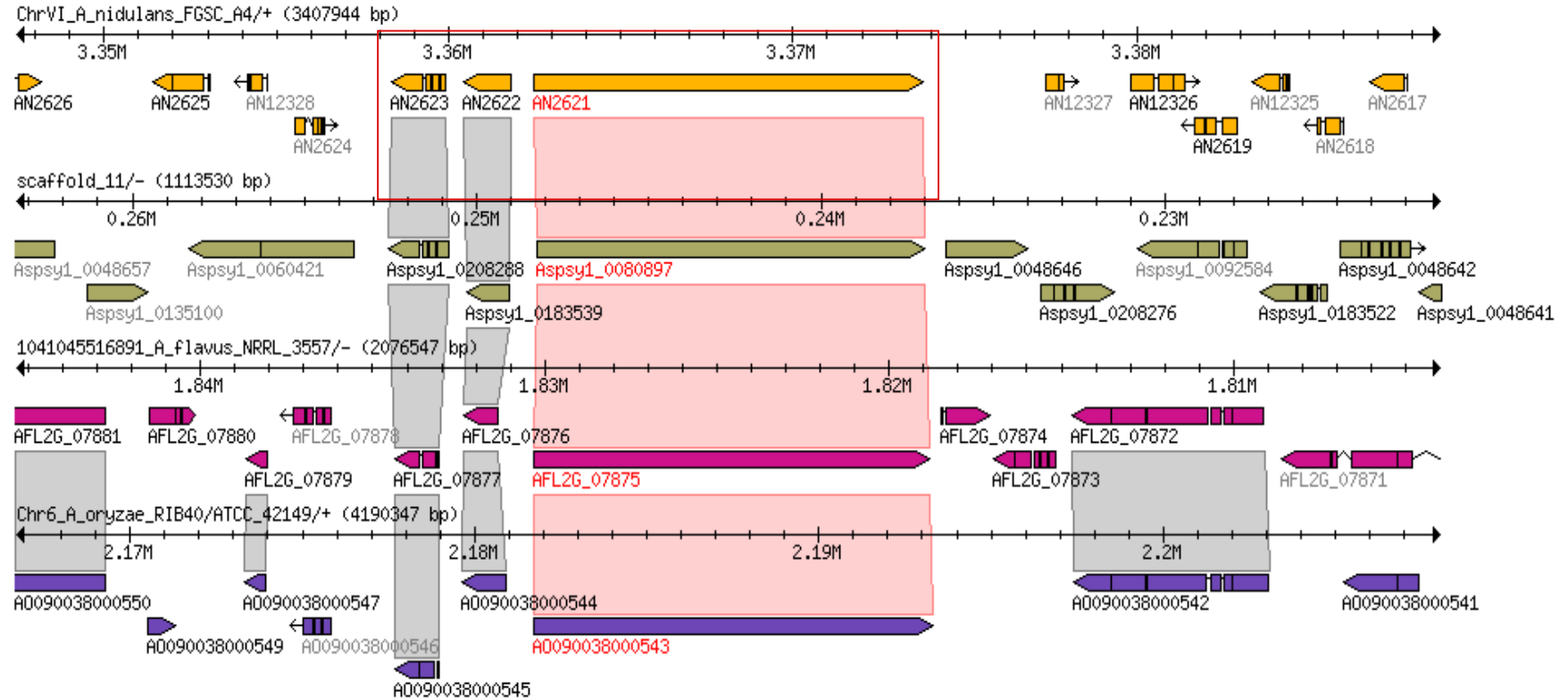


Monodictyphenone (mdp) cluster

Gene id (SMURF)*	Gene positions	Gene distance (SMURF)	Annotated_gene_function	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	prot_ID_1731	AN11846	
n/a					Protein of unknown function	prot_ID_484	AN9540	
n/a					Histidine acid phosphatase	prot_ID_804	AN10039	
n/a				mdpA	Transcription coactivator	prot_ID_401	AN10021	ED
n/a				mdpB	Scytalone dehydratase	prot_ID_886	AN10049	
AN0146.3	4	631	conserved hypothetical protein	mdpC	Versicolorin ketoreductase	prot_ID_916	AN0146	
AN0147.3	3	527	conserved hypothetical protein	mdpD	Flavin-containing monooxygenase	prot_ID_1395	AN0147	
AN0148.3	2	1479	conserved hypothetical protein	mdpE	C6 zinc finger transcription	prot_ID_164	AN0148	
AN0149.3	1	469	conserved hypothetical protein	mdpF	zinc-dependent hydrolase	prot_ID_619	AN0149	
AN0150.3	0	0	polyketide synthase	mdpG	Polyketide synthase	prot_ID_1601	AN0150	
AN10022.3	-1	306	conserved hypothetical protein	mdpH	DUF 1772 superfamily protein	prot_ID_856	AN10022	
AN10035.3	-2	368	conserved hypothetical protein	mdpI	AMP-binding CoA ligase	prot_ID_642	AN10035	
AN10038.3	-3	146	hypothetical protein	mdpJ	Glutathione S transferase	prot_ID_351	AN10038	
AN10044.3	-4	365	conserved hypothetical protein	mdpK	Oxidoreductase	prot_ID_271	AN10044	
AN10023.3	-5	361	conserved hypothetical protein	mdpL	Protein of unknown function	prot_ID_1333	AN10023	ED
AN0153.3	-6	484	hypothetical protein		MYB DNA binding protein TFIID and SAGA complex TAF10 subunit	prot_ID_1307	AN0153	
AN0154.3	-7	239	hypothetical protein		Protein of unknown function	prot_ID_81	AN0154	
AN10037.3	-8	386	conserved hypothetical protein		Transmembrane transporter	prot_ID_1576	AN10037	
AN10036.3	-9	736	conserved hypothetical protein		Monoxygenase	prot_ID_1112	AN10036	
AN10024.3	-10	557	conserved hypothetical protein		Inositol tetrakisphosphate 3-kinase	prot_ID_105	AN10024	
AN0156.3	-11	242	conserved hypothetical protein		Protein of unknown function	prot_ID_1001	AN0156	
AN0157.3	-12	1490	conserved hypothetical protein		Protein of unknown function	n/a	AN0157	
AN0158.3	-13	117	conserved hypothetical protein		2-alkenal reductase [NAD(P)]	n/a	AN0158	

Penicillin cluster

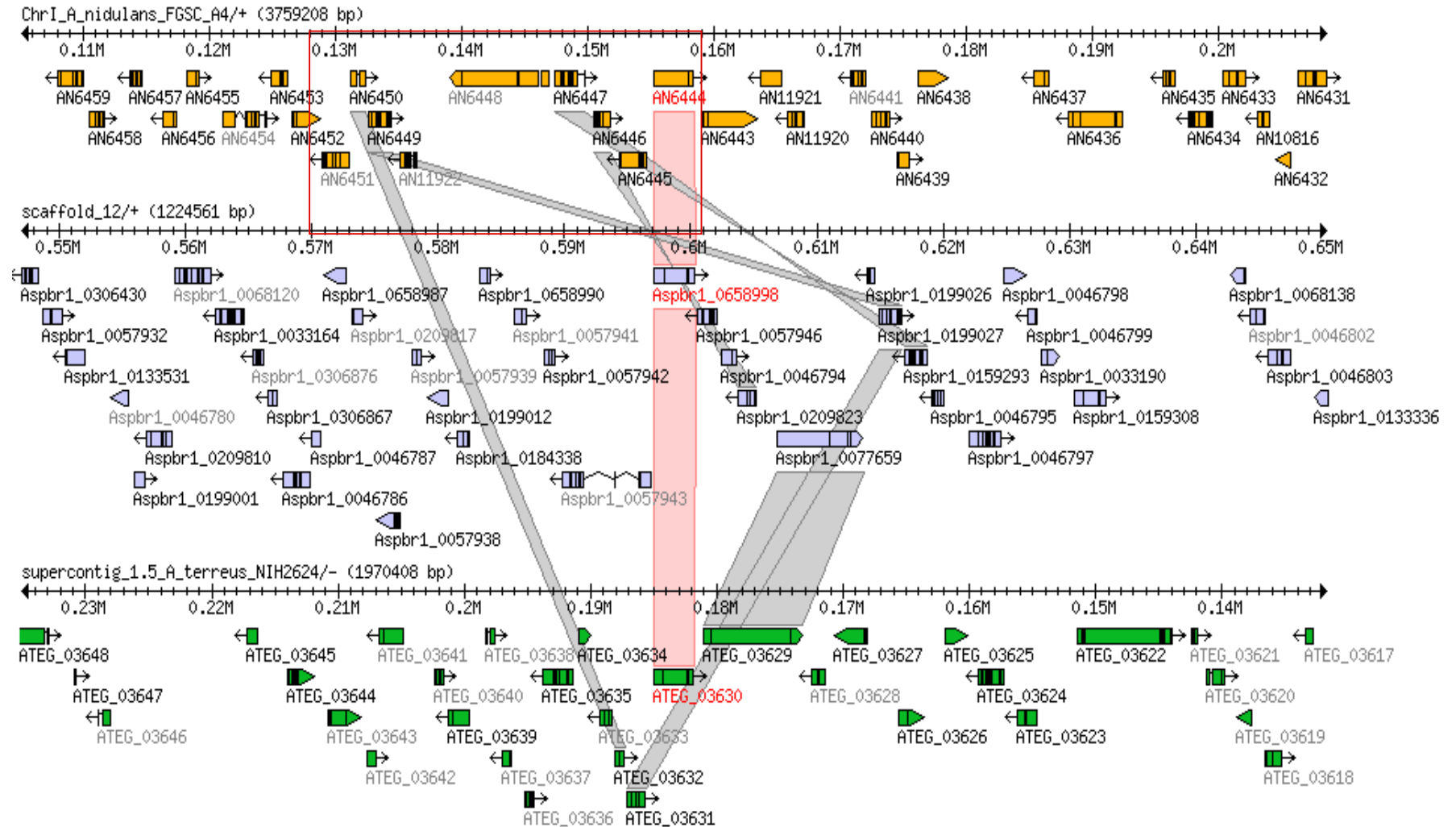
Experimentally determined cluster



Penicillin cluster

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n/a					RNA-directed DNA polymerase	prot_ID_101	AN2616	
n/a					Protein of unknown function	prot_ID_694	AN2617	
n/a					Protein of unknown function	prot_ID_207	AN2618	
n/a					Protein of unknown function	prot_ID_1131	AN12325	
AN2619.3	2	243	conserved hypothetical protein		Protein of unknown function	prot_ID_803	AN2619	
n/a					Domain(s) with predicted carbohydrate binding	prot_ID_1159	AN12326	
n/a					Protein of unknown function	prot_ID_1105	AN12327	
AN2621.3	0	0	N-(5-amino-5-carboxypentanoyl)-L-cysteinyl-D-valine synthase AcvA	acvA	Delta-(L-alpha-aminoadipyl)-L-cysteinyl-D-valine synthetase	prot_ID_480	AN2621	ED
AN2622.3	-1	873	isopenicillin N synthetase	aatA	Isopenicillin-N N-acyltransferase	prot_ID_1092	AN2622	
AN2623.3	-2	614	acyl-coenzyme A:6-aminopenicillanic-acid-acyltransferase precursor		Acyl-coenzyme A:6-aminopenicillanic-acid-acyltransferase precursor	prot_ID_581	AN2623	ED
AN2624.3	-3	2161	conserved hypothetical protein		Protein of unknown function	prot_ID_99	AN2624	
AN11354.3	-4	772	hypothetical protein		AN11354 was deleted in current assembly, see AN12328			
n/a					Protein of unknown function	prot_ID_1144	AN12328	
AN2625.3	-5	1274	conserved hypothetical protein		Transmembrane transporter	prot_ID_692	AN2625	
n/a					Protein of unknown function	prot_ID_205	AN2626	
n/a					Mariner transposon-related ORF	prot_ID_384	AN10329	

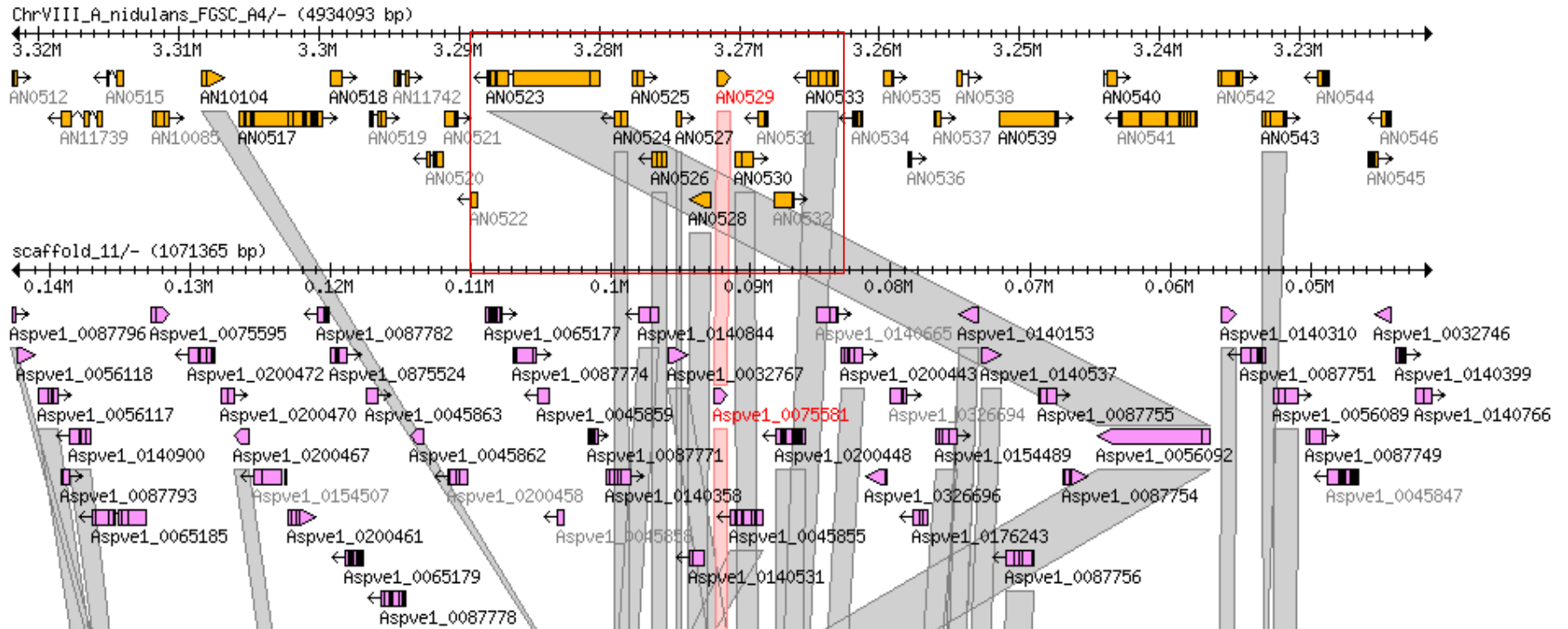
pkb cluster



pkb cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
AN6436.3	15	1688	hypothetical protein		Transmembrane transporter	n/a		
AN6437.3	14	2435	conserved hypothetical protein		Protein of unknown function	n/a		
AN11508.3	13	3575	predicted protein		Deleted by the Broad	n/a		
AN6438.3	12	558	conserved hypothetical protein		Dipeptidyl-peptidase	prot_ID_6	AN6438	
AN6439.3	11	1202	conserved hypothetical protein		Protein of unknown function	prot_ID_692	AN6439	
AN6440.3	10	583	conserved hypothetical protein		Protein of unknown function	prot_ID_891	AN6440	
AN6441.3	9	2059	conserved hypothetical protein		Protein of unknown function	prot_ID_323	AN6441	
n/a					Oxidoreductase	prot_ID_1298	AN11920	
n/a					Protein of unknown function	prot_ID_1257	AN11921	
AN10817.3	8	957	predicted protein		Deleted ORF	n/a		
AN6442.3	7	85	conserved hypothetical protein		Deleted by the Broad	n/a		
AN6443.3	6	753	conserved hypothetical protein		Oxidoreductase	prot_ID_447	AN6443	
AN6444.3	5	636	NRPS-like enzyme		NRPS-like enzyme	prot_ID_1133	AN6444	EP
AN6445.3	4	828	conserved hypothetical protein		Aryl-alcohol oxidase-related protein	prot_ID_572	AN6445	
AN6446.3	3	325	conserved hypothetical protein		Myb-like transcription factor	prot_ID_5	AN6446	
AN11509.3	2	357	predicted protein		Deleted by the Broad	n/a		
AN6447.3	1	565	conserved hypothetical protein		O-methyltransferase	prot_ID_690	AN6447	
n/a					Protein of unknown function	prot_ID_1310	AN11922	
n/a				pkbA	Putative polyketide synthase; involved in cichorine production	n/a	AN6448	
n/a				CYP5077A1	cytochrome P450	n/a	AN6449	
n/a					tetrahydroxynaphthalene reductase	n/a	AN6450	
n/a					transmembrane transporter	n/a	AN6451	EP

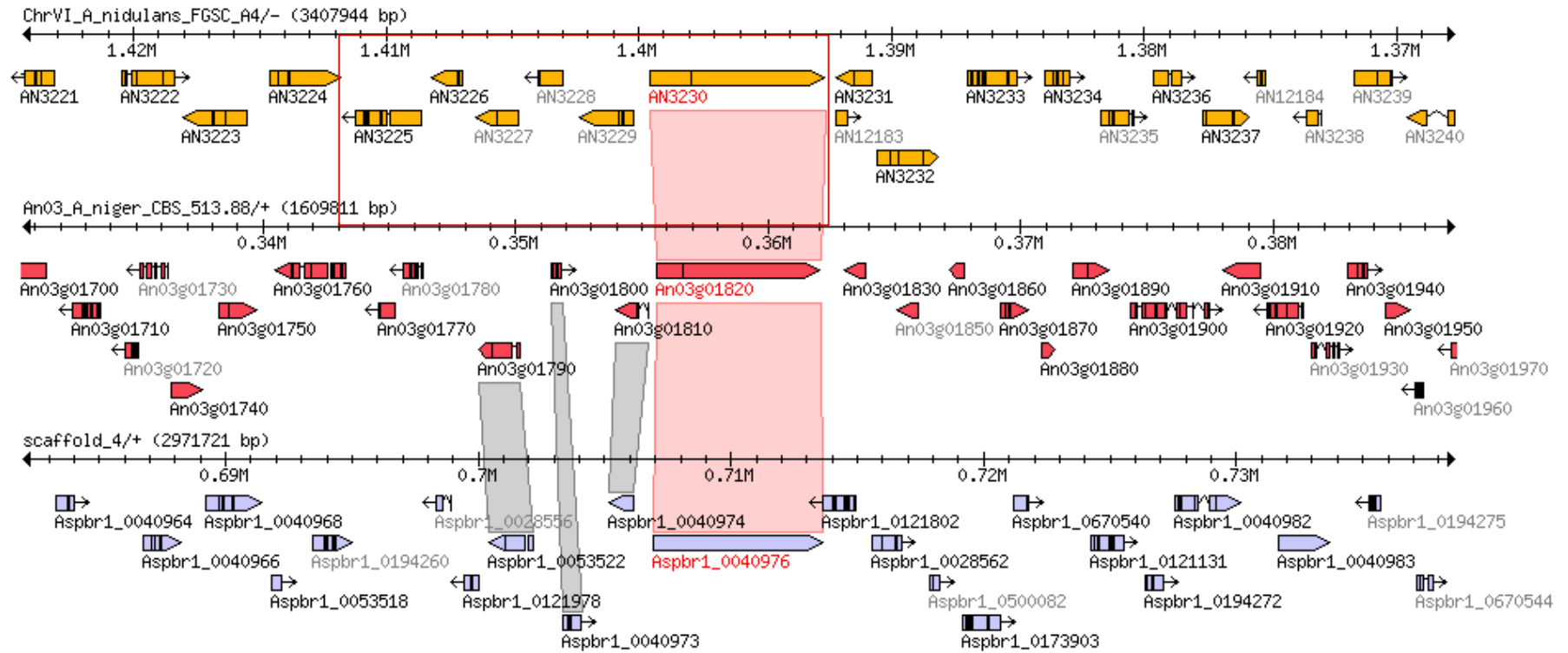
pkdA cluster



pkdA cluster

Gene id (SMURF)*	Gene positions	Gene distance (SMURF)	Annotated_gene_function	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	prot_ID_911	AN10104	
n/a					Chitinase	prot_ID_1677	AN0517	
n/a					Protein of unknown function	prot_ID_454	AN0518	
n/a					Protein of unknown function	prot_ID_910	AN0519	
n/a					Protein of unknown function UDP-N-acetylmuramate dehydrogenase	prot_ID_1720	AN11742	
AN0520.3	3	301	conserved hypothetical protein			prot_ID_218	AN0520	
AN0521.3	2	917	conserved hypothetical protein		Oxidoreductase	prot_ID_671	AN0521	
AN0522.3	1	720	hypothetical protein		Protein of unknown function	prot_ID_1135	AN0522	
AN0523.3	0	0	polyketide synthase	pkdA	Polyketide synthase	prot_ID_1596	AN0523	ECS
AN0524.3	-1	1032	conserved hypothetical protein		Protein of unknown function	prot_ID_372	AN0524	
AN0525.3	-2	271	conserved hypothetical protein		Oxidoreductase	prot_ID_827	AN0525	
AN0526.3	-3	497	conserved hypothetical protein		Oxidoreductase	prot_ID_1302	AN0526	
AN0527.3	-4	661	conserved hypothetical protein		histidine acid phosphatase	prot_ID_76	AN0527	
AN0528.3	-5	786	conserved hypothetical protein		Transmembrane transporter	prot_ID_530	AN0528	
AN0529.3	-6	485	conserved hypothetical protein		Protein of unknown function	prot_ID_995	AN0529	
AN0530.3	-7	524	conserved hypothetical protein		Monoxygenase	prot_ID_295	AN0530	
AN0531.3	-8	353	conserved hypothetical protein		Protein of unknown function	prot_ID_747	AN0531	
AN0532.3	-9	563	conserved hypothetical protein		DDE1 transposon-related ORF	prot_ID_1218	AN0532	
AN0533.3	-10	1006	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	prot_ID_1675	AN0533	ECS
n/a					GTPase	prot_ID_452	AN0534	

pkf cluster



pkf cluster

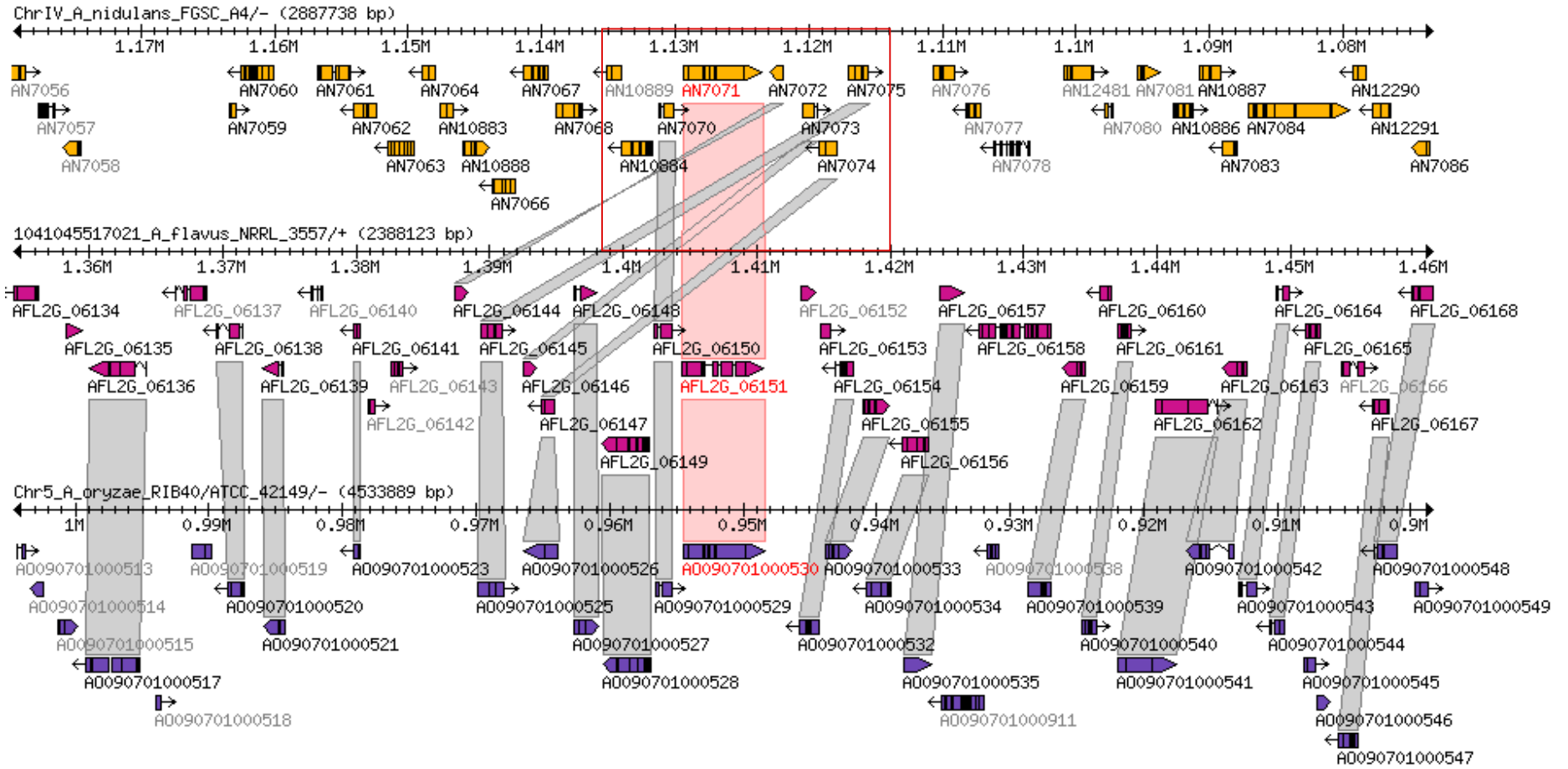
Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a						n/a		
n/a						n/a		
AN3217.3	13	2312	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	n/a	AN3217	
AN3218.3	12	300	conserved hypothetical protein		Protein of unknown function	n/a	AN3218	
AN3219.3	11	648	hypothetical protein		Protein of unknown function	n/a	AN3219	
AN3220.3	10	795	conserved hypothetical protein		Predicted substrate-specific transmembrane transporter	n/a	AN3220	
AN3221.3	9	2732	conserved hypothetical protein		Transmembrane transporter	n/a	AN3221	
AN3222.3	8	614	conserved hypothetical protein		IMP 5'-nucleotidase	prot_ID_646	AN3222	
AN3223.3	7	661	6-phosphofructokinase	pkfA	6-phosphofructokinase	prot_ID_157	AN3223	
AN3224.3	6	1400	conserved hypothetical protein		RNA polymerase II mediator complex component SRB4	prot_ID_748	AN3224	
AN3225.3	5	677	conserved hypothetical protein		Cytochrome P450	prot_ID_253	AN3225	EP
AN3226.3	4	567	conserved hypothetical protein		HAS domain protein	prot_ID_855	AN3226	
AN3227.3	3	951	conserved hypothetical protein		Monooxygenase	prot_ID_362	AN3227	
AN3228.3	2	741	conserved hypothetical protein		Prenyltransferase	prot_ID_968	AN3228	
AN3229.3	1	922	conserved hypothetical protein		Aryl-alcohol oxidase	prot_ID_466	AN3229	
AN3230.3	0	0	polyketide synthase	pkfA	Polyketide synthase	prot_ID_643	AN3230	ECS, EP
n/a					Protein of unknown function	prot_ID_1124	AN12183	
AN3231.3	-1	380	hypothetical protein		Domain(s) with predicted metal ion transmembrane transporter activity	prot_ID_156	AN3231	
AN3232.3	-2	334	conserved hypothetical protein		Pantothenate transmembrane transporter	prot_ID_747	AN3232	
AN11379.3	-3	292	predicted protein		Deleted ORF	n/a		
AN3233.3	-4	1290	conserved hypothetical protein		Domain(s) with predicted substrate-specific transmembrane transporter activity	prot_ID_252	AN3233	
AN3234.3	-5	1060	conserved hypothetical protein		Oxidoreductase	prot_ID_853	AN3234	
AN3235.3	-6	1280	conserved hypothetical protein		Monooxygenase	prot_ID_360	AN3235	
AN3236.3	-7	792	conserved hypothetical protein		O-methyltransferase	prot_ID_965	AN3236	
AN3237.3	-8	866	conserved hypothetical protein		Protein of unknown function	prot_ID_464	AN3237	

n/a
n/a

Protein of unknown function
Protein of unknown function

prot_ID_1137 AN12184
prot_ID_1073 AN3238

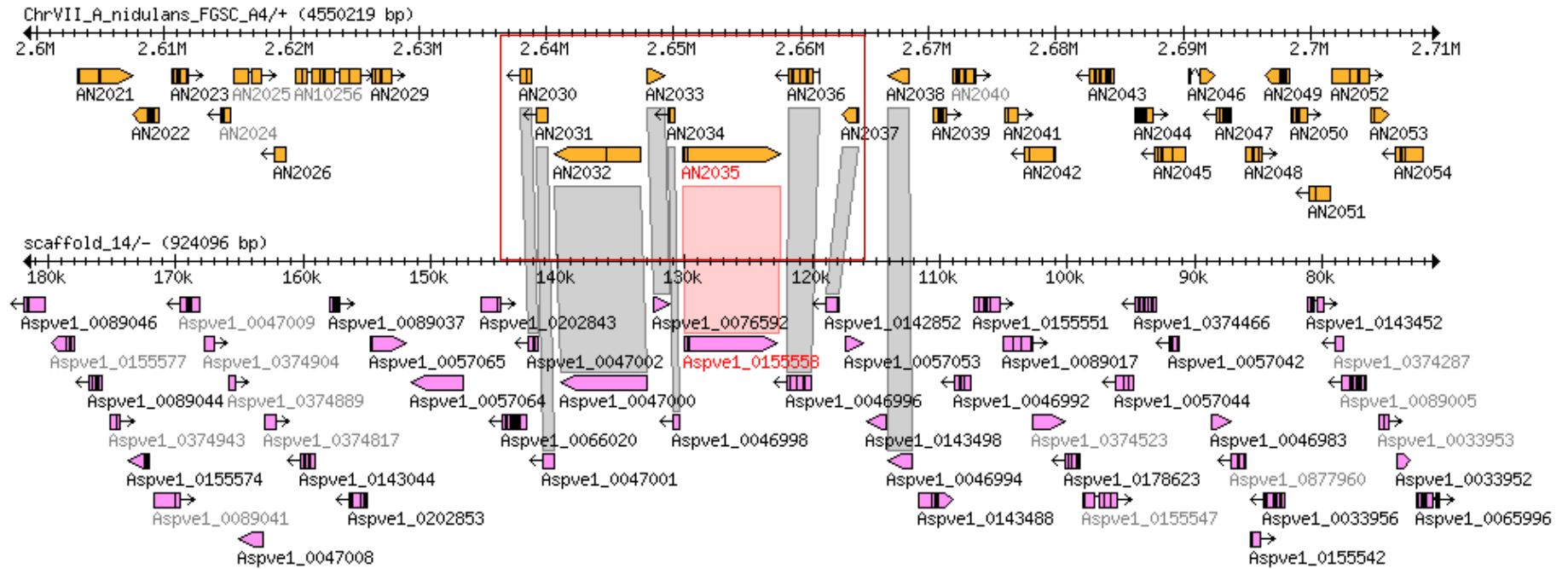
pkg cluster



pkg cluster

Gene id (SMURF)*	Gene positions	Gene distance (SMURF)	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	n/a	AN7059	
n/a					Monophenol monooxygenase	n/a	AN7060	
AN7061.3	12	83	hypothetical protein		Zn(II)2Cys6 transcription factor	n/a	AN7061	
AN7062.3	11	852	conserved hypothetical protein		Protein of unknown function	n/a	AN7062	
AN7063.3	10	532	conserved hypothetical protein		N,N-dimethylaniline monooxygenase	n/a	AN7063	
AN7064.3	9	357	conserved hypothetical protein		Fumarylacetoacetate hydrolase family protein	prot_ID_650	AN7064	
AN10883.3	8	662	hypothetical protein		Protein of unknown function	prot_ID_391	AN10883	
AN10888.3	7	243	hypothetical protein		Monooxygenase	prot_ID_150	AN10888	
AN7066.3	6	557	conserved hypothetical protein	CYP670A1	Cytochrome P450	prot_ID_741	AN7066	
AN7067.3	5	650	conserved hypothetical protein		Domain(s) with predicted substrate-specific transmembrane transporter activity	prot_ID_322	AN7067	
AN7068.3	4	1785	conserved hypothetical protein		Vanillyl alcohol oxidase	prot_ID_839	AN7068	
AN10889.3	3	36	conserved hypothetical protein		O-methyltransferase	prot_ID_656	AN10889	EP
AN10884.3	2	459	conserved hypothetical protein		Oxidoreductase	prot_ID_904	AN10884	
AN7070.3	1	596	conserved hypothetical protein	pkgB	Beta-lactamase-type thioesterase	prot_ID_563	AN7070	
AN7071.3	0	0	polyketide synthase	pkgA	Polyketide synthase	prot_ID_144	AN7071	
AN7072.3	-1	455	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	prot_ID_649	AN7072	
AN7073.3	-2	1428	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	prot_ID_231	AN7073	
AN7074.3	-3	368	conserved hypothetical protein		Oxidoreductase UDP-N-acetylmuramate dehydrogenase	prot_ID_740	AN7074	
AN7075.3	-4	927	conserved hypothetical protein		Oxidoreductase UDP-N-acetylmuramate dehydrogenase	prot_ID_321	AN7075	ECS, EP
n/a					Protein of unknown function	prot_ID_837	AN7076	
n/a				acnA	Actinin-like protein	prot_ID_412	AN7077	
n/a					Protein of unknown function	prot_ID_930	AN7078	

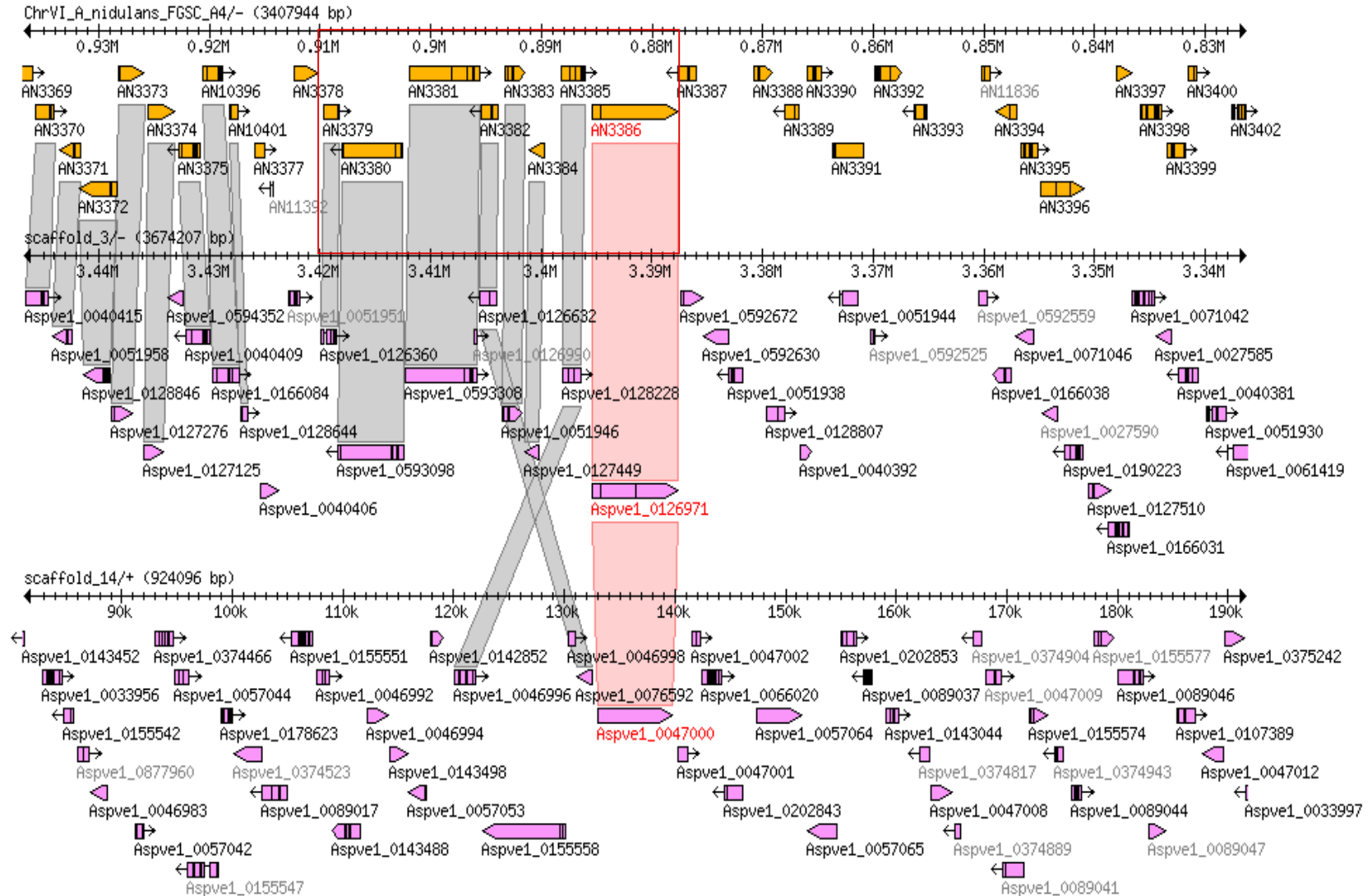
pkh cluster



pkh cluster

Gene id (SMURF)*	Gene positions	Gene distance (SMURF)	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					F-box protein	prot_ID_1288	AN2029	
n/a					Oxidoreductase	prot_ID_44	AN2030	ECS, IGD
n/a					Protein of unknown function	prot_ID_858	AN2031	
AN2032.3	3	582	polyketide synthase	pkhA	Polyketide synthase	prot_ID_184	AN2032	
AN2033.3	2	383	conserved hypothetical protein		Monooxygenase	prot_ID_1003	AN2033	
AN2034.3	1	542	conserved hypothetical protein		Protein of unknown function	prot_ID_328	AN2034	
AN2035.3	0	0	polyketide synthase	pkhB	polyketide synthase	prot_ID_1143	AN2035	
AN2036.3	-1	692	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	prot_ID_475	AN2036	
AN11323.3	-2	768	predicted protein		AN11323.3 was deleted from the current assembly	prot_ID_1226	AN10256	
AN2037.3	-3	1187	hypothetical protein similar to CipA protein		Oxidoreductase	prot_ID_1286	AN2037	
AN2038.3	-4	2542	conserved hypothetical protein		Oxidoreductase	prot_ID_616	AN2038	EP
AN2039.3	-5	2085	conserved hypothetical protein		Oxidoreductase	prot_ID_1430	AN2039	
AN2040.3	-6	518	conserved hypothetical protein	CYP552A21	Cytochrome P450	prot_ID_181	AN2040	
AN2041.3	-7	2200	conserved hypothetical protein		Protein of unknown function	prot_ID_1001	AN2041	
AN2042.3	-8	446	conserved hypothetical protein		FAD binding domain protein	prot_ID_327	AN2042	
AN2043.3	-9	2733	conserved hypothetical protein		Amino acid transmembrane transporter	n/a	AN2043	

pki cluster

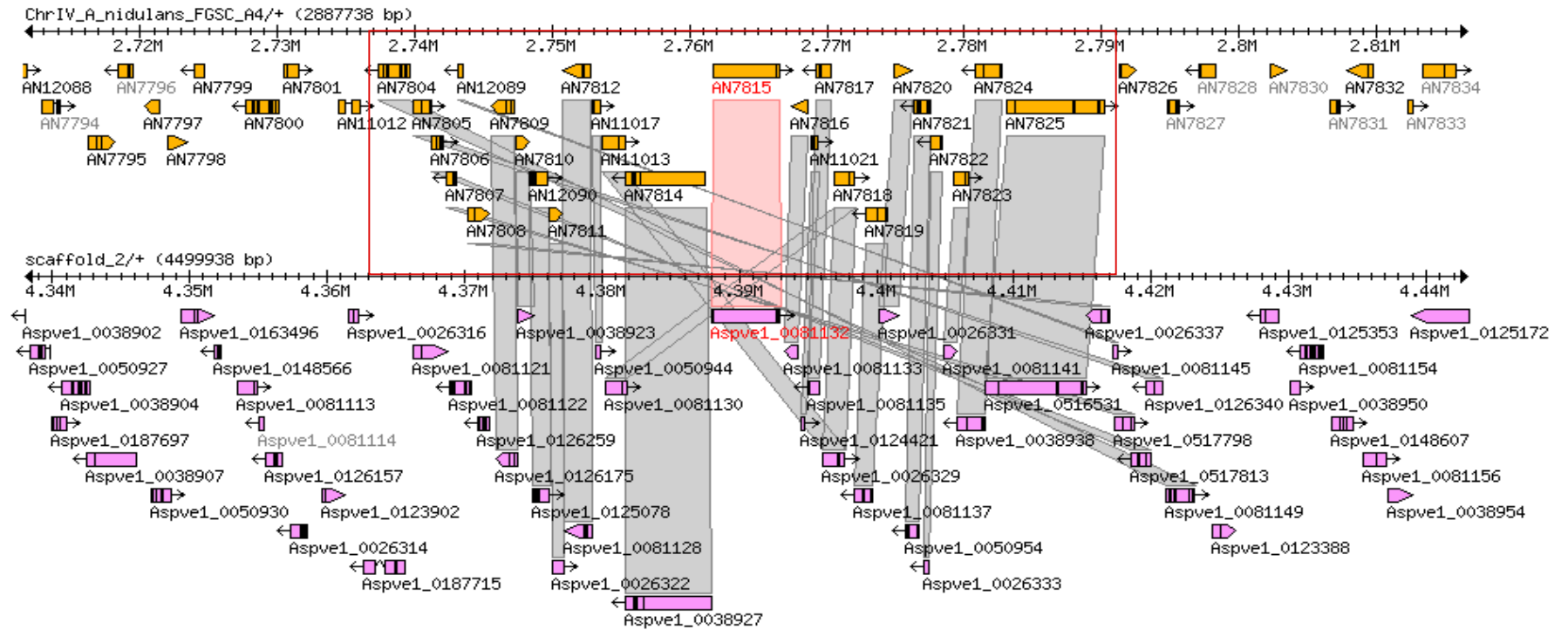


pki cluster

Gene id (SMURF)*	Gene positions	Gene distance (SMURF)	Annotated_gene_function	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	n/a	AN3379	ECS
AN3380.3	6	633	fatty acid synthase FasA	pkiB	fatty-acyl-CoA synthase	prot_ID_242	AN3380	
AN3381.3	5	514	conserved hypothetical protein	pkiC	Fatty acid synthetase subunit	prot_ID_843	AN3381	
AN3382.3	4	599	hypothetical protein	salA	Salicylate 1-monooxygenase	prot_ID_351	AN3382	
AN3383.3	3	337	conserved hypothetical protein		Transmembrane transporter	prot_ID_955	AN3383	
AN3384.3	2	1745	conserved hypothetical protein		Trichothecene 3-O-acetyltransferase	prot_ID_456	AN3384	
AN3385.3	1	1000	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	prot_ID_1063	AN3385	
AN3386.3	0	0	polyketide synthase	pkiA	Polyketide synthase	prot_ID_554	AN3386	ECS
n/a				gprD	G-protein coupled receptor	prot_ID_68	AN3387	
n/a				amyF	Apha-amylase	prot_ID_664	AN3388	
n/a				xghA	Xylogalacturonan hydrolase	prot_ID_175	AN3389	
n/a				pmeA	Pectinesterase	prot_ID_349	AN3390	
n/a					C2H2 and Zn(2)-Cys(6) DNA binding transcription factor	prot_ID_954	AN3391	
n/a					Monooxygenase	prot_ID_455	AN3392	

Sterigmatocystin (stc) cluster

Experimentally determined cluster



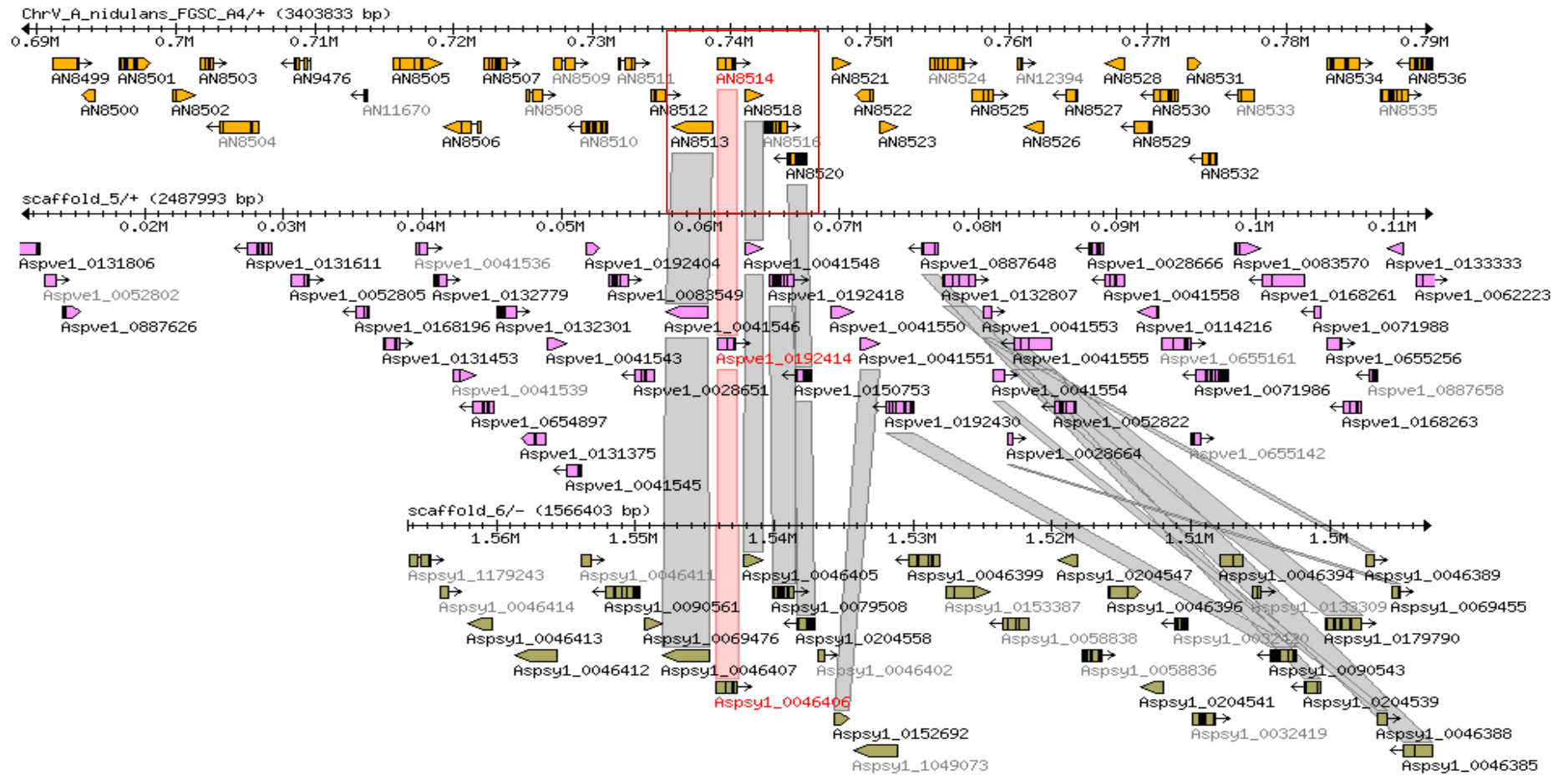
Sterigmatocystin (stc) cluster

Gene id (SMURF)*	Gene positions	Gene distance (SMURF)	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function;	n/a	AN11012	
n/a				stcW	FAD-containing monooxygenase	n/a	AN7804	ED
n/a				stcV	Norsolorinic acid reductase	n/a	AN7805	
AN7806.3	11	199	ketoreductase StcU/VerA	stcU	Versicolorin reductase	n/a	AN7806	
AN7807.3	10	644	sterigmatocystin biosynthesis protein StcT	stcT	Translation elongation factor 1 gamma	n/a	AN7807	
AN7808.3	9	150	sterigmatocystin biosynthesis P450 monooxygenase StcS	stcS	sterigmatocystin biosynthesis CYP59 family P450 monooxygenase	n/a	AN7808	
AN11020.3	8	0	hypothetical protein		ORF not present in AspGD	n/a	AN11020	
AN7809.3	7	160	conserved hypothetical protein		Protein of unknown function	n/a	AN7809	
AN7810.3	6	1201	conserved hypothetical protein stcQ		Protein of unknown function	n/a	AN7810	
AN7811.3	5	35	conserved hypothetical protein stcO		Protein of unknown function	n/a	AN7811	
AN7812.3	4	188	conserved hypothetical protein stcN		Versicolorin B synthase	n/a	AN7812	
AN11017.3	3	93	conserved hypothetical protein		Protein of unknown function	n/a	AN11017	
AN11013.3	2	5	hypothetical protein similar to VerB	stcK	Polyketide synthase/fatty acid synthase beta	n/a	AN11013	
AN7814.3	1	495	sterigmatocystin biosynthesis fatty acid synthase subunit beta	stcL	Polyketide synthase/fatty acid synthase alpha	n/a	AN7814	
AN7815.3	0	0	sterigmatocystin biosynthesis fatty acid synthase alpha subunit		Protein of unknown function	prot_ID_37	AN7815	
AN7816.3	-1	936	conserved hypothetical protein stcI		Lipase/esterase	prot_ID_547	AN7816	
AN11021.3	-2	151	predicted protein		Protein of unknown function	prot_ID_665	AN11021	
AN7817.3	-3	190	conserved hypothetical protein		Protein of unknown function	prot_ID_125	AN7817	
AN7818.3	-4	176	conserved hypothetical protein stcF		P450 monooxygenase	prot_ID_634	AN7818	
AN7819.3	-5	930	conserved hypothetical protein		Protein of unknown function	prot_ID_214	AN7819	
AN7820.3	-6	502	sterigmatocystin biosynthesis C6 transcription factor	afIR	Zn(II)2Cys6 transcription factor	prot_ID_361	AN7820	
AN7821.3	-7	192	conserved hypothetical protein stcE		Norsolorinic acid reductase	prot_ID_876	AN7821	
AN7822.3	-8	314	conserved hypothetical protein		Protein of unknown function	prot_ID_456	AN7822	
AN7823.3	-9	1121	conserved hypothetical protein stcC		peroxidase	prot_ID_36	AN7823	

AN7825.3	-10	2887	sterigmatocystin polyketide synthase	stcA	Polyketide synthase	prot_ID_123	AN7825	
AN7824.3	-11	134	sterigmatocystin biosynthesis P450 monooxygenase StcB	stcB	P450 monooxygenase	prot_ID_545	AN7824	ED
n/a					Protein of unknown function	prot_ID_632	AN7826	
n/a					Protein of unknown function	prot_ID_213	AN7827	
n/a					Unsaturated rhamnogalacturonan hydrolase	prot_ID_722	AN7828	
n/a					Protein of unknown function	prot_ID_452	AN7830	
n/a					Protein of unknown function	prot_ID_35	AN7831	
n/a					Oxidoreductase	prot_ID_544	AN7832	

Terriquinone (tdi) cluster

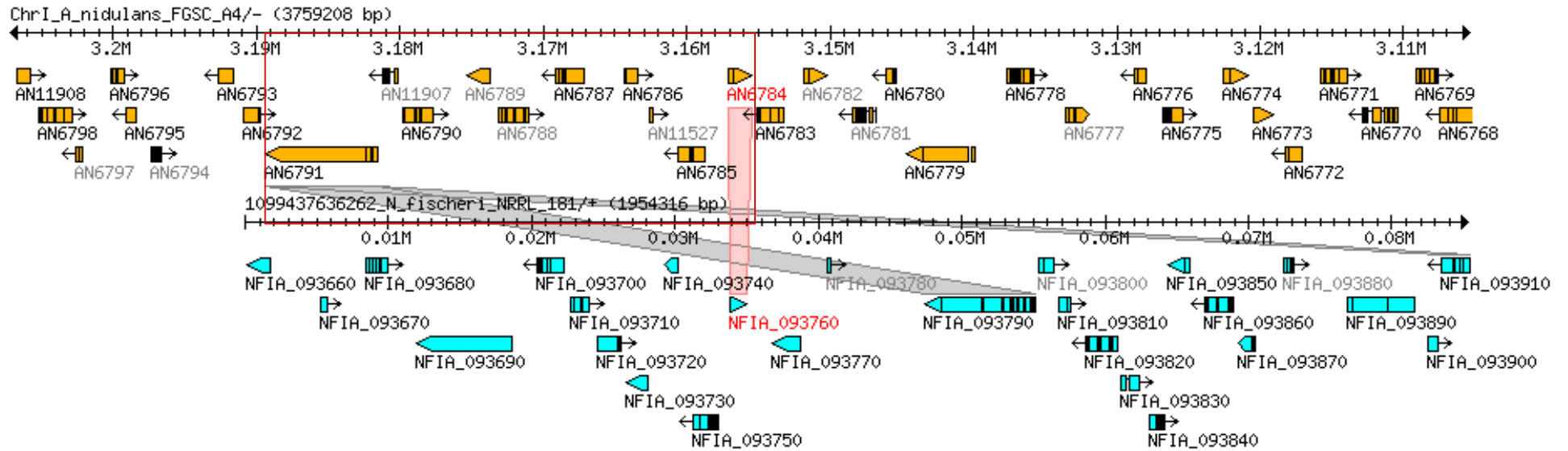
Experimentally determined cluster



Terriquinone (tdi) cluster

Gene id (SMURF)*	Gene positions	Gene distance (SMURF)	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
AN8506.3	8	306	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	n/a		
AN8507.3	7	1377	conserved hypothetical protein		Transmembrane transporter	n/a		
AN8508.3	6	808	conserved hypothetical protein		Protein of unknown function	prot_ID_374	AN8508	
AN8509.3	5	414	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	prot_ID_929	AN8509	
AN8510.3	4	824	conserved hypothetical protein	CYP686A1P	Cytochrome P450; possibly a pseudogene	prot_ID_66	AN8510	
AN8511.3	3	1034	conserved hypothetical protein		Branched chain amino acid aminotransferase	prot_ID_640	AN8511	
AN8512.3	2	287	conserved hypothetical protein		Protein of unknown function, adjacent to tdi (terrequinone) gene cluster	prot_ID_165	AN8512	
AN8513.3	1	390	NRPS-like enzyme	tdiA	Putative single-module nonribosomal peptide synthetase (NRPS)	prot_ID_737	AN8513	ED
AN8514.3	0	0	DMATS type aromatic prenyltransferase	tdiB	Asterriquinone prenyltransferase	prot_ID_270	AN8514	
AN8515.3	-1	651	conserved hypothetical protein			n/a		
AN8516.3	-2	217	conserved hypothetical protein	tdiD	Aminotransferase	prot_ID_372	AN8516	
n/a				tdiE	Protein of unknown function	n/a		
n/a				tdiC	NADPH-dependent quinone reductase	prot_ID_473	AN8518	
n/a				tdiE	Protein of unknown function	prot_ID_162	AN8520	ED
n/a					Protein of unknown function, adjacent to tdi (terrequinone) gene cluster	prot_ID_735	AN8521	
n/a						prot_ID_268	AN8522	

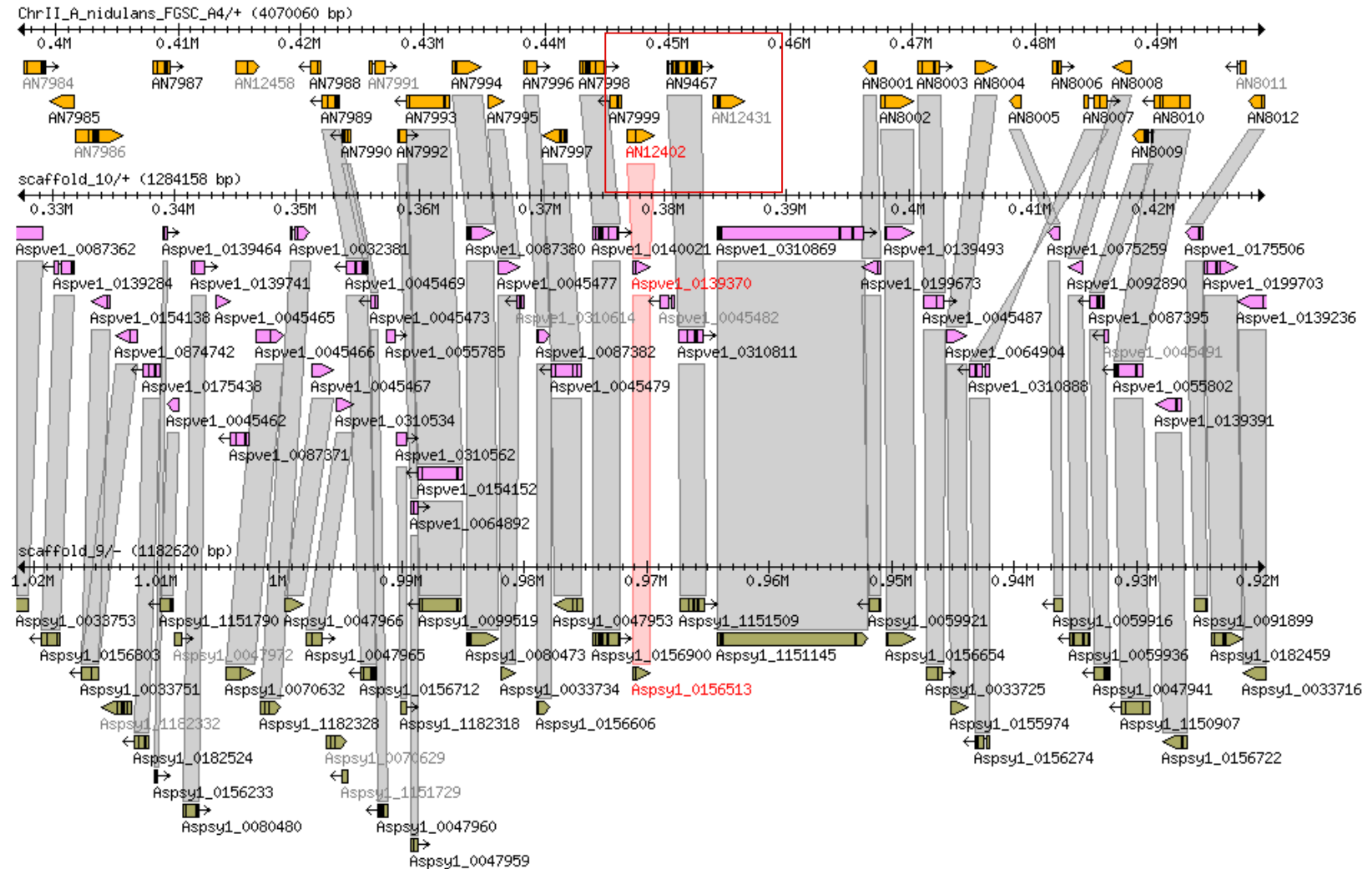
xptA-containing cluster



xptA-containing cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
AN6791.3	-8	1801	polyketide synthase, putative		Polyketide synthase	n/a	AN6791	FA, EP
AN6790.3	-7	2598	hypothetical protein		Zn(II)2Cys6 transcription factor	n/a	AN6790	
AN6789.3	-6	1015	conserved hypothetical protein		Protein of unknown function	n/a	AN6789	
AN6788.3	-5	1614	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	n/a	AN6788	
AN6787.3	-4	2709	conserved hypothetical protein	CYP682C1	Cytochrome P450	n/a	AN6787	
AN6786.3	-3	907	hypothetical protein		Beta-1,4-endoglucanase	prot_ID_1076	AN6786	
AN11527.3	-2	1870	predicted protein		Protein of unknown function	prot_ID_1002	AN11527	
AN6785.3	-1	1786	conserved hypothetical protein DMATS type aromatic prenyltransferase, putative		Protein of unknown function	prot_ID_391	AN6785	
AN6784.3	0	0		xptA	DMATS) type aromatic prenyltransferase	prot_ID_954	AN6784	FA, EP
AN6783.3	1	511	conserved hypothetical protein		Nucleobase transmembrane transporter	prot_ID_266	AN6783	
AN6782.3	2	1455	hypothetical protein		Sodium:dicarboxylate symporter	prot_ID_839	AN6782	
AN6781.3	3	1773	hypothetical protein		Protein of unknown function	prot_ID_152	AN6781	
AN6780.3	4	1202	conserved hypothetical protein		Protein of unknown function ABC superfamily multidrug resistance-associated protein	prot_ID_720	AN6780	
AN6779.3	5	865	conserved hypothetical protein		Transmembrane transporter	n/a	AN6779	
AN6778.3	6	2235	conserved hypothetical protein		Transmembrane transporter	n/a	AN6778	
AN6777.3	7	2270	conserved hypothetical protein		F-box protein	n/a	AN6777	
AN6776.3	8	2843	conserved hypothetical protein		Hydrolase	n/a	AN6776	
AN6775.3	9	1227	conserved hypothetical protein	aatB	penicillin biosynthesis protein	n/a	AN6775	
AN6774.3	10	2879	conserved hypothetical protein		Transmembrane transporter	n/a	AN6774	
AN6773.3	11	532	conserved hypothetical protein		Triglyceride lipase	n/a	AN6773	
AN6772.3	12	896	conserved hypothetical protein		Protein of unknown function	n/a	AN6772	
AN6771.3	13	1250	conserved hypothetical protein		Protein of unknown function	n/a	AN6771	
AN6770.3	14	1038	conserved hypothetical protein		Amino acid transmembrane transporter	n/a	AN6770	

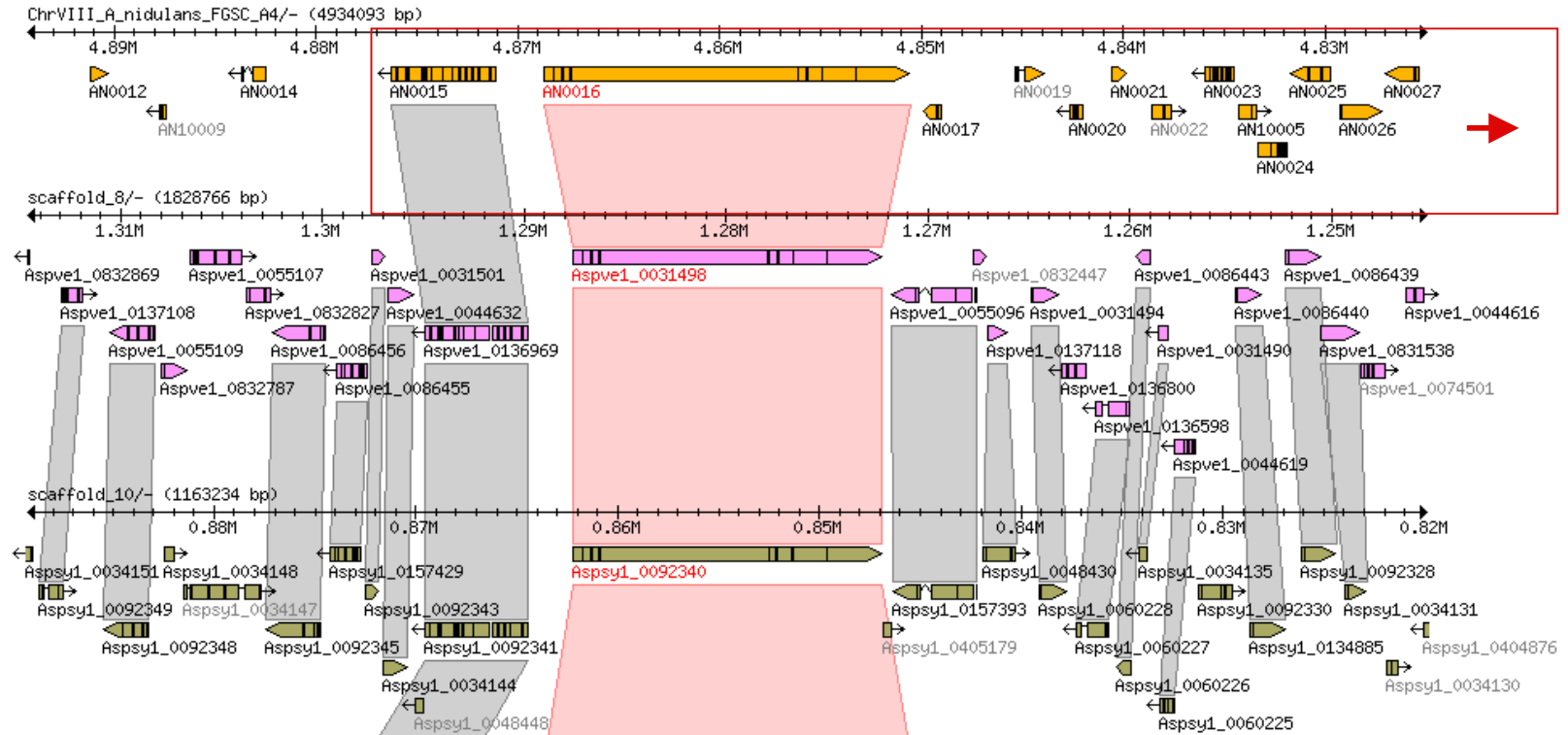
xptB-containing cluster



xptB-containing cluster

Gene id (SMURF)*	Gene positions	Gene distance (SMURF)	Annotated_gene_function	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	prot_ID_678	AN7996	
n/a					RNA polymerase III transcription factor subunit	prot_ID_74	AN7997	
n/a					GMC oxidoreductase	prot_ID_804	AN7998	
n/a					Oxidoreductase	prot_ID_202	AN7999	ECS
n/a				xptB	Prenyltransferase	prot_ID_1407	AN12402	
n/a					Serine/threonine phosphatase	prot_ID_601	AN9467	
n/a					Protein of unknown function	prot_ID_1451	AN12431	IGD

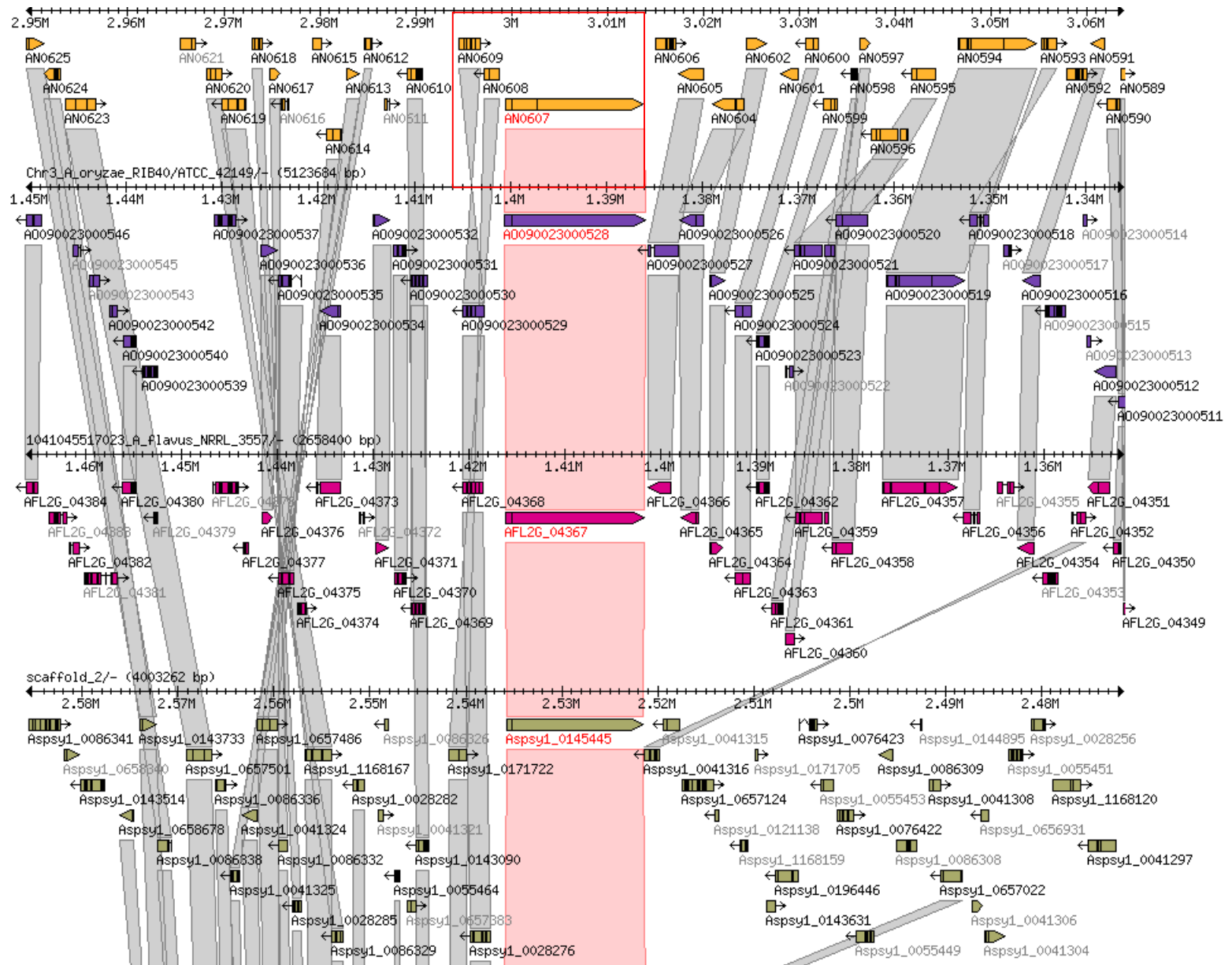
AN0016 cluster



AN0016 cluster

Gene id (SMURF)*	Gene positions	Gene distance (SMURF)	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	prot_ID_562	AN10009	
n/a					Protein of unknown function	prot_ID_465	AN0014	
AN0015.3	1	2389	conserved hypothetical protein		Transmembrane transporter	prot_ID_922	AN0015	ECS, IGD
AN0016.3	0	0	nonribosomal peptide synthase pes1		Nonribosomal peptide synthase	prot_ID_1400	AN0016	
AN0017.3	-1	632	copper homeostasis protein CutC		Copper ion homeostasis protein	prot_ID_169	AN0017	
AN0019.3	-3	702	conserved hypothetical protein		Protein of unknown function	prot_ID_1093	AN0019	
AN0020.3	-4	1304	conserved hypothetical protein		Protein of unknown function	prot_ID_381	AN0020	
AN0021.3	-5	1452	conserved hypothetical protein		Protein of unknown function	prot_ID_837	AN0021	
AN0022.3	-6	1246	conserved hypothetical protein aglA		alpha-1,4-galactosidase	prot_ID_1311	AN0022	
AN0023.3	-7	1592	conserved hypothetical protein		Oxidoreductase	prot_ID_85	AN0023	
AN10005.3	-8	290	hypothetical protein		Oxidoreductase	prot_ID_403	AN10005	
AN0024.3	-9	34	conserved hypothetical protein		Oxidoreductase	prot_ID_541	AN0024	
AN0025.3	-10	173	conserved hypothetical protein		N,N-dimethylaniline monooxygenase	prot_ID_1007	AN0025	
AN0026.3	-11	514	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	n/a	AN0026	
AN0027.3	-12	61	conserved hypothetical protein		N,N-dimethylaniline monooxygenase	n/a	AN0027	
AN0028.3	-13	388	conserved hypothetical protein		Hydrolase	n/a	AN0028	
AN0029.3	-14	482	conserved hypothetical protein		Transmembrane transporter	n/a	AN0029	FA

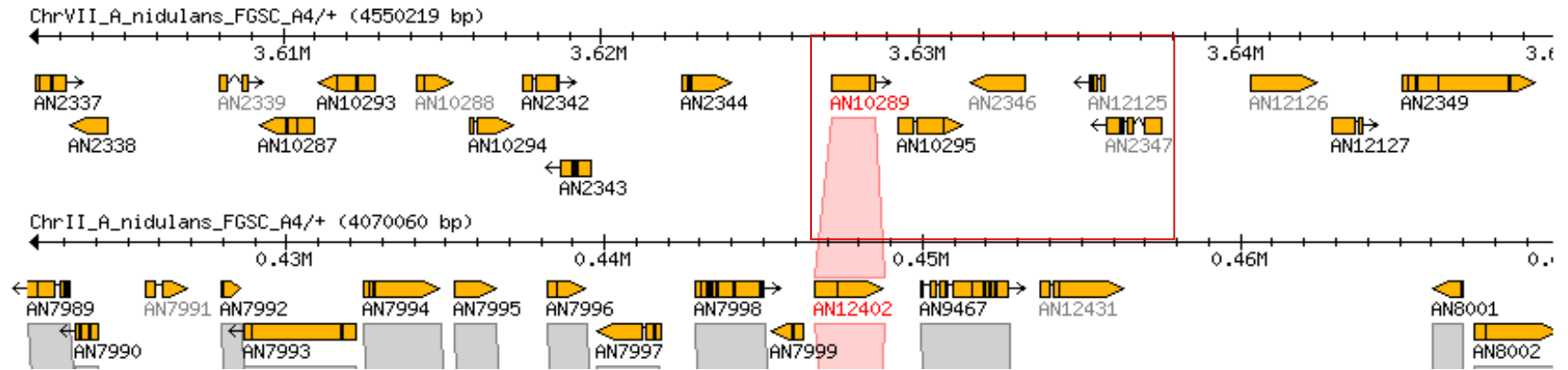
AN0607 (sidC) cluster



AN0607 (sidC) cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
AN0592.3	14	1007	conserved hypothetical protein		RNA binding protein	n/a	AN0592	
AN0593.3	13	579	conserved hypothetical protein		Dehydrogenase	n/a	AN0593	
AN0594.3	12	2588	conserved hypothetical protein		Cell morphogenesis protein	n/a	AN0594	
AN0595.3	11	596	NADPH--cytochrome P450 reductase		NADPH-cytochrome P450 reductase	n/a	AN0595	
AN0596.3	10	420	conserved hypothetical protein ddbA		DNA damage binding protein		AN0596	
AN0597.3	9	453	hypothetical protein		Protein of unknown function	n/a	AN0597	
AN0598.3	8	1584	conserved hypothetical protein		Ortholog(s) have role in response to DNA damage stimulus	n/a	AN0598	
AN0599.3	7	425	conserved hypothetical protein		Oxidoreductase	prot_ID_1569	AN0599	
AN0600.3	6	1051	conserved hypothetical protein		Protein of unknown function	prot_ID_1023	AN0600	
AN0601.3	5	1423	conserved hypothetical protein		Transmembrane transporter	prot_ID_1496	AN0601	
AN0602.3	4	1202	conserved hypothetical protein		Protein of unknown function	prot_ID_273	AN0602	
AN0604.3	3	1058	conserved hypothetical protein		Endonuclease	prot_ID_1195	AN0604	
AN0605.3	2	309	conserved hypothetical protein		Protein of unknown function	prot_ID_1650	AN0605	
AN0606.3	1	1226	conserved hypothetical protein	CYP5076A1	Cytochrome P450	prot_ID_431	AN0606	
AN0607.3	0	0	nonribosomal peptide siderophore synthase SidC	sidC	Non-ribosomal peptide synthetase, siderophore biosynthesis	prot_ID_887	AN0607	ECS
n/a					Protein of unknown function	prot_ID_1364	AN0608	
n/a					N',N'',N'''-triacetylfusarinine C biosynthetic protein	prot_ID_134	AN0609	ECS, IGD
n/a					VIC potassium ion channel, beta subunit	prot_ID_1109	AN0610	
n/a					Protein of unknown function	prot_ID_1573	AN0611	
n/a					Protein of unknown function	prot_ID_348	AN0612	
n/a					Protein of unknown function	prot_ID_803	AN0613	
n/a					Transmembrane transporter	prot_ID_1277	AN0614	
n/a					Protein of unknown function	prot_ID_53	AN0615	
n/a					Protein of unknown function	prot_ID_508	AN0616	
n/a					Lyase domain predicted	prot_ID_968	AN0617	

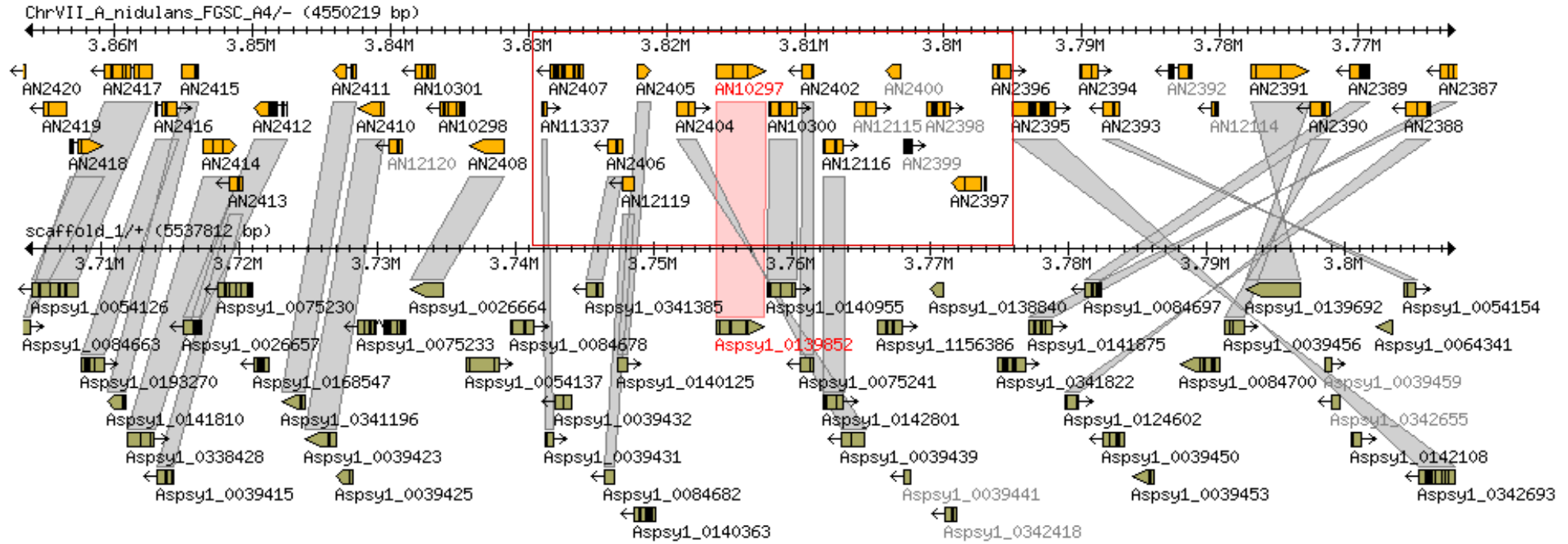
AN10289 cluster



AN10289 cluster

Gene id (SMURF)*	Gene positions	Gene distance (SMURF)	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	n/a	AN2339	
n/a					Protein of unknown function	n/a	AN10287	
n/a					Protein of unknown function	n/a	AN10293	
n/a					Protein of unknown function	n/a	AN10288	
AN10294.3	4	312	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	prot_ID_162	AN10294	
AN2342.3	3	136	conserved hypothetical protein		Protein of unknown function	prot_ID_1034	AN2342	
AN2343.3	2	2917	conserved hypothetical protein		Nitroreductase	prot_ID_364	AN2343	
AN2344.3	1	3119	conserved hypothetical protein		Transmembrane transporter	prot_ID_1175	AN2344	
AN10289.3	0	0	DMATS type aromatic prenyltransferase		DMATS-type aromatic prenyltransferase	prot_ID_1122	AN10289	IGD
AN10295.3	-1	742	conserved hypothetical protein		B-zip transcription factor	prot_ID_981	AN10295	
AN2346.3	-2	670	conserved hypothetical protein		Protein of unknown function	prot_ID_1323	AN2346	
n/a					Protein of unknown function	prot_ID_1498	AN12125	
AN2347.3	-3	2567	conserved hypothetical protein	CYP504E4P	Cytochrome P450; possibly a pseudogene	prot_ID_650	AN2347	FA, IGD
AN2348.3	-4	2821	conserved hypothetical protein hypothetical protein similar to ATP-binding cassette multidrug transport protein		Deleted ORF ABC transporter of the P-glycoprotein cluster	n/a	AN2348	
AN2349.3	-5	1443	ATRC	atrC		n/a	AN2349	

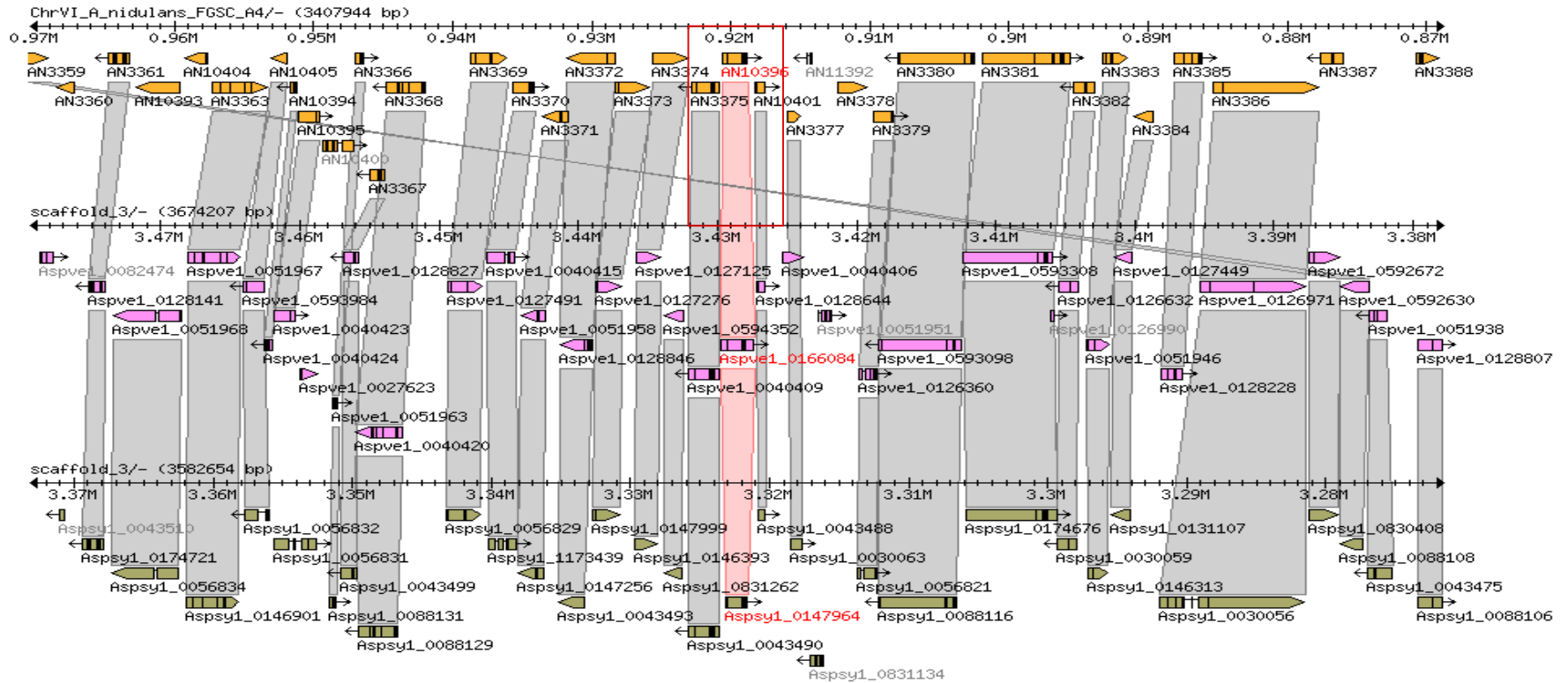
AN10297 cluster



AN10297 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
AN2392.3	13	2333	conserved hypothetical protein		bHLH transcription factor	n/a		
AN11336.3	12	1051	predicted protein		Deleted by the Broad	n/a		
AN2393.3	11	506	conserved hypothetical protein		Short chain oxidoreductase/dehydrogenase	n/a		
AN2394.3	10	1565	conserved hypothetical protein		Protein of unknown function	n/a		
AN2395.3	9	1167	conserved hypothetical protein		beta-glucuronidase	prot_ID_1215	AN2395	
AN2396.3	8	704	conserved hypothetical protein		Oxidoreductase	prot_ID_543	AN2396	FA
AN2397.3	7	144	conserved hypothetical protein		Protein of unknown function	prot_ID_1361	AN2397	
AN2398.3	6	1196	conserved hypothetical protein		O-methyltransferase	prot_ID_691	AN2398	
AN2399.3	5	281	conserved hypothetical protein		Protein of unknown function	prot_ID_23	AN2399	
AN2400.3	4	525	hypothetical protein		Protein of unknown function	prot_ID_557	AN2400	
AN2401.3	3	664	conserved hypothetical protein		Deleted ORF; AN2401 split into AN12115 and AN12116	n/a		
n/a					Protein of unknown function	prot_ID_1530	AN12115	
n/a					Transmembrane transporter	prot_ID_1543	AN12116	
AN2402.3	2	414	conserved hypothetical protein		Oxidoreductase	prot_ID_704	AN2402	
AN10300.3	1	403	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	prot_ID_316	AN10300	
AN10297.3	0	0	NRPS-like enzyme		NAD-binding acyl CoA synthetase	prot_ID_1121	AN10297	
AN2404.3	-1	1650	conserved hypothetical protein		Protein of unknown function	prot_ID_849	AN2404	
AN2405.3	-2	1952	conserved hypothetical protein		Methyltransferase	prot_ID_171	AN2405	
n/a					Protein of unknown function	prot_ID_1486	AN12119	
AN2406.3	-3	1109	conserved hypothetical protein		N-methyltransferase	prot_ID_992	AN2406	
AN2407.3	-4	1905	conserved hypothetical protein		Domain(s) with predicted role in isoprenoid biosynthetic process	prot_ID_314	AN2407	
AN11337.3	-5	166	predicted protein		Protein of unknown function	prot_ID_861	AN11337	FA
AN2408.3	-6	2805	conserved hypothetical protein		Protein of unknown function	prot_ID_1132	AN2408	
AN10298.3	-7	539	conserved hypothetical protein		3-phosphoserine aminotransferase	prot_ID_453	AN10298	
AN10301.3	-8	428	conserved hypothetical protein		Domain(s) with predicted nucleotide binding activity	n/a	AN10301	

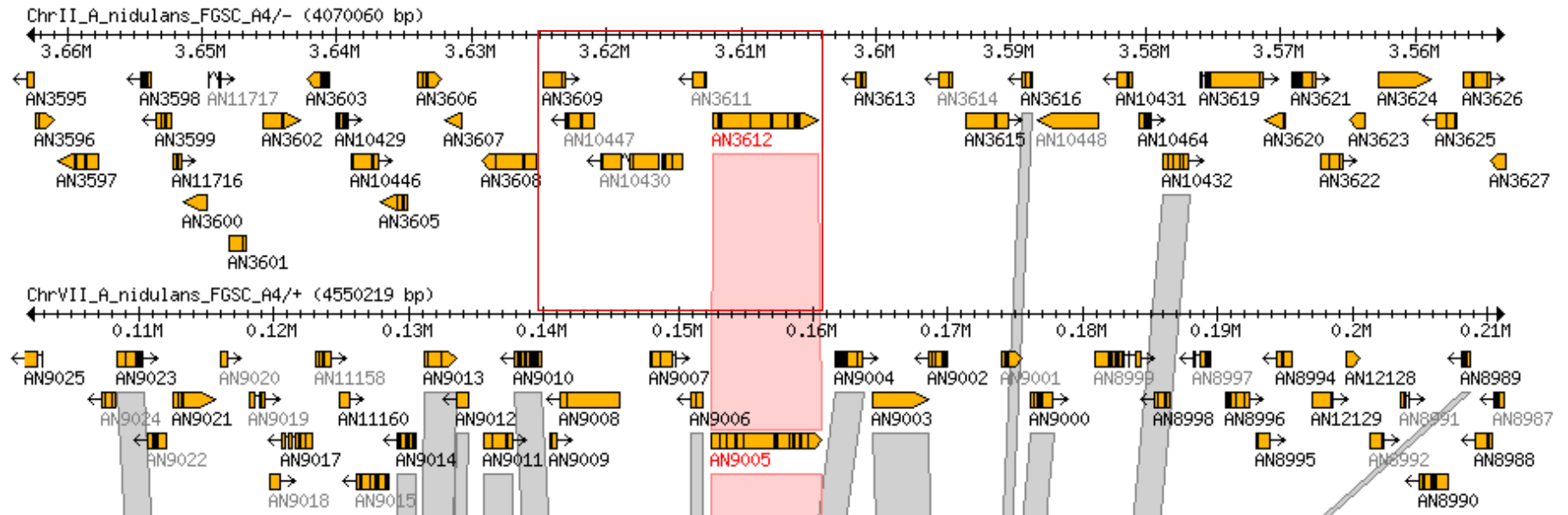
AN10396 cluster



AN10396 cluster

Gene id (SMURF)*	Gene positions	Gene distance (SMURF)	Annotated_gene_function	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Zn(II)2Cys6 transcription factor	n/a	AN3369	
n/a					Protein of unknown function	n/a	AN3370	
n/a					Protein of unknown function	n/a	AN3371	
n/a				scaA	Camptothecin resistance conferring protein rcaA	prot_ID_244	AN3372	
n/a					DNA-directed polymerase kappa	prot_ID_844	AN3373	
n/a					Protein of unknown function	prot_ID_352	AN3374	
n/a					DnaJ domain protein Farnesyl-diphosphate farnesyltransferase	prot_ID_957	AN3375	ECS
n/a					Protein of unknown function	prot_ID_418	AN10396	
n/a					Aspartic-type endopeptidase	prot_ID_1029	AN10401	ECS, IGD
n/a					Protein of unknown function	prot_ID_1064	AN3377	
n/a					Protein of unknown function	prot_ID_454	AN11392	
n/a					homocysteine S-methyltransferase	prot_ID_555	AN3378	
n/a					Protein of unknown function	prot_ID_69	AN3379	

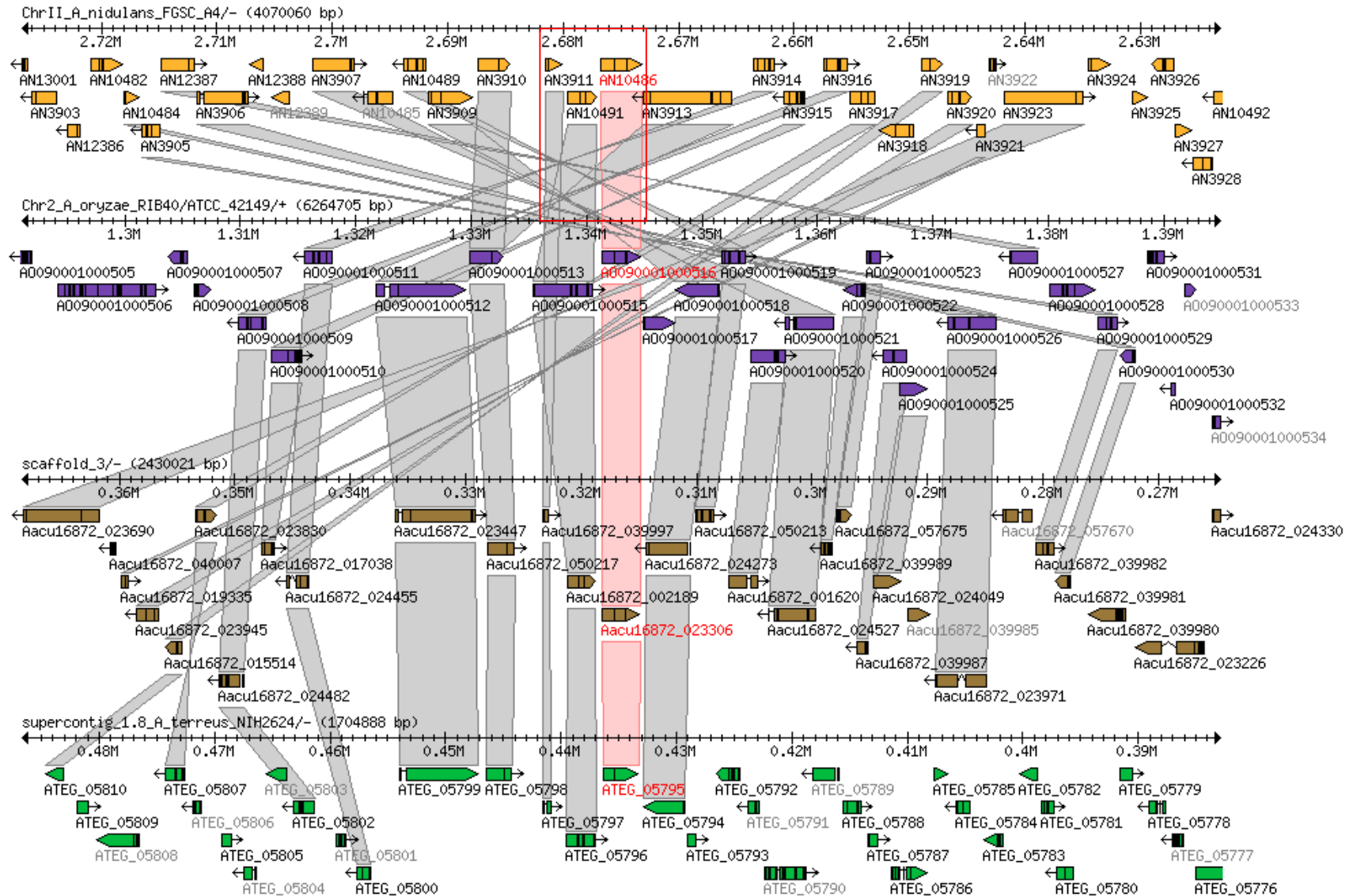
AN10430 cluster



AN10430 cluster

Gene id (SMURF)*	Gene positions	Gene distance (SMURF)	Annotated_gene_function	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Phosphoserine phosphatase	prot_ID_665	AN10429	
n/a					Phosphoprotein phosphatase	prot_ID_59	AN10446	
n/a					Oxidoreductase	prot_ID_906	AN3605	
n/a					Protein of unknown function	prot_ID_296	AN3606	
n/a				IreB	zinc-finger transcription factor	prot_ID_1042	AN3607	
AN3608.3	3	506	hypothetical protein similar to ABC transporter protein AtrC	atrC	ABC transporter	prot_ID_423	AN3608	
AN3609.3	2	25	conserved hypothetical protein	CYP681A1	Cytochrome P450	prot_ID_1168	AN3609	FA
AN10447.3	1	615	conserved hypothetical protein		Acyl transferase	prot_ID_789	AN10447	
AN10430.3	0	0	polyketide synthase		Polyketide synthase	prot_ID_886	AN10430	
AN3611.3	-1	773	conserved hypothetical protein		Protein of unknown function	prot_ID_769	AN3611	
AN3612.3	-2	425	polyketide synthase		Polyketide synthase	prot_ID_164	AN3612	FA
n/a				xlnA	Endo-1,4-beta-xylanase	prot_ID_903	AN3613	
n/a					Protein of unknown function	prot_ID_292	AN3614	
n/a					Predicted ATP binding, nucleoside-triphosphatase	prot_ID_1039	AN3615	
n/a					Oxidoreductase	prot_ID_421	AN3616	
n/a				tprA	Tetratricopeptide repeat (TPR)-containing protein	prot_ID_186	AN10448	

AN10486 cluster

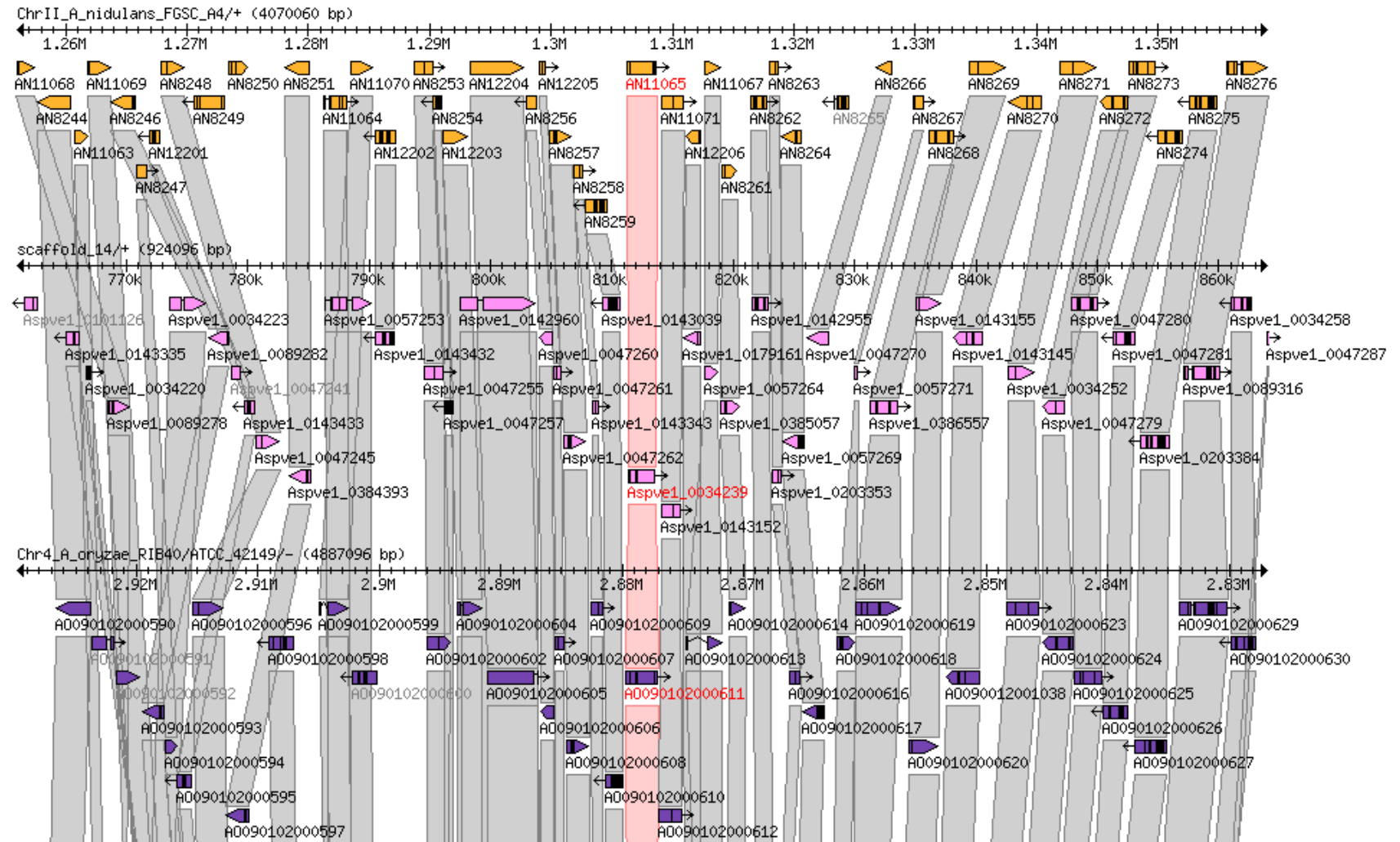


AN10486 cluster

Gene id (SMURF)*	Gene positions	Gene distance (SMURF)	Annotated_gene_function	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Serine/threonine protein kinase	prot_ID_1180	AN10485	
n/a				FKBP5	FKBP-type peptidyl-prolyl cis-trans isomerase	prot_ID_92	AN10489	
n/a					Deoxycytidyl transferase	prot_ID_451	AN3909	
n/a					Sister chromatid separation protein	prot_ID_670	AN3910	
AN3911.3	2	769	hypothetical protein similar to SndA		Zn(II)2Cys6 transcription factor	prot_ID_67	AN3911	ECS
AN10491.3	1	532	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	prot_ID_1053	AN10491	
AN10486.3	0	0	NRPS-like enzyme		NRPS-like enzyme	prot_ID_566	AN10486	ECS
AN3913.3	-1	673	hypothetical protein similar to adenylate cyclase	cyaA	Adenylate cyclase	prot_ID_192	AN3913	
AN3914.3	-2	2816	conserved hypothetical protein	crhA	Transglycosidase	prot_ID_937	AN3914	
AN10490.3	-3	35	predicted protein		Deleted by the Broad			
AN3915.3	-4	648	conserved hypothetical protein		Transmembrane transporter	prot_ID_321	AN3915	
AN3916.3	-5	2058	conserved hypothetical protein		Glycerol kinase	prot_ID_1070	AN3916	
AN3917.3	-6	195	conserved hypothetical protein	CYP539D1	Putative cytochrome P450	prot_ID_448	AN3917	

AN11065 cluster

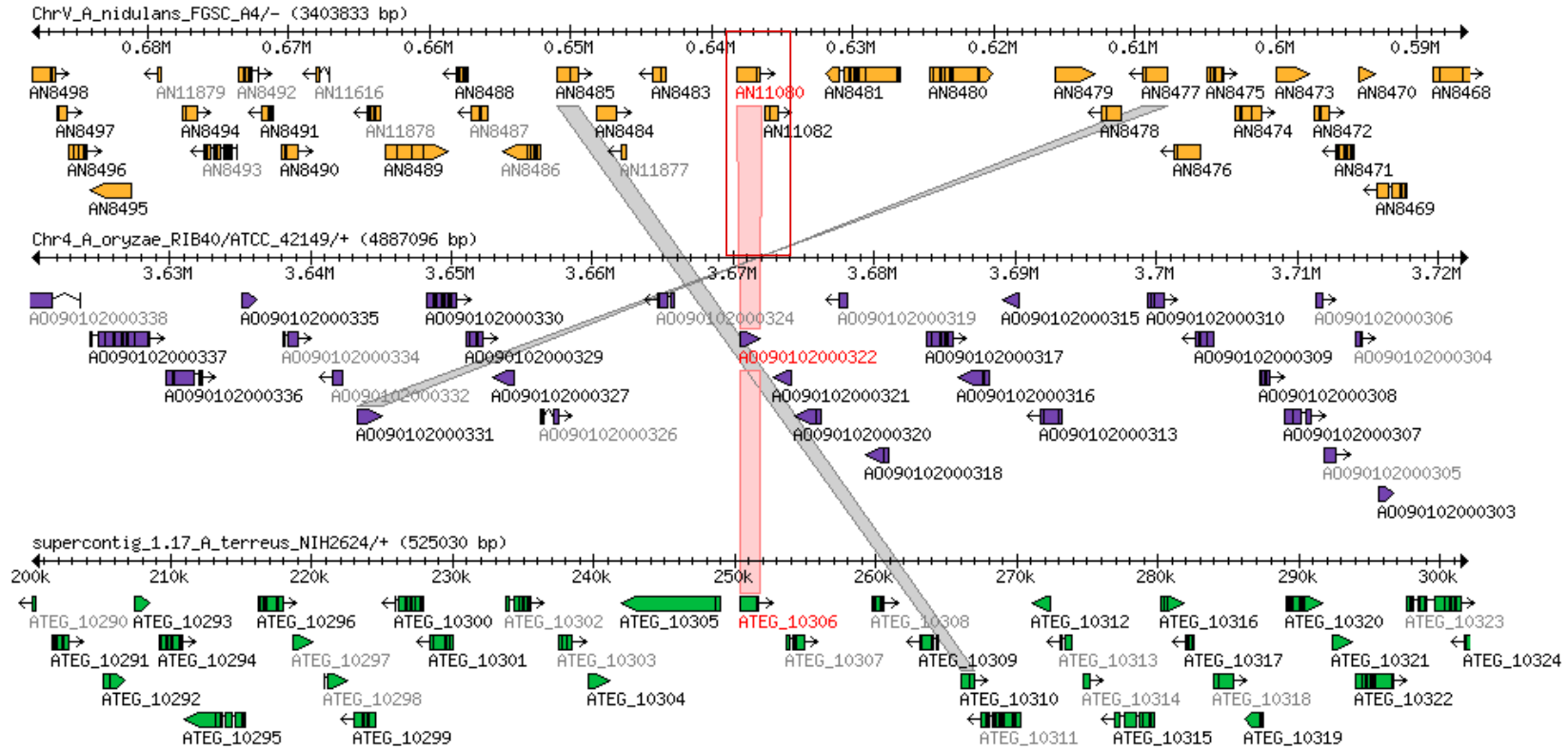
No manual prediction made, functional annotations unrelated to secondary metabolism



AN11065 cluster

Gene id (SMURF)*	Gene positions	Gene distance (SMURF)	Annotated_gene_function	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID
n/a					Protein of unknown function	prot_ID_1372	AN12204
n/a					50S ribosomal protein L27	prot_ID_335	AN8256
n/a					Protein of unknown function	prot_ID_1416	AN12205
n/a					Scramblase family protein	prot_ID_1080	AN8257
n/a					Ubiquitin-conjugating enzyme	prot_ID_464	AN8258
n/a					Endodeoxyribonuclease	prot_ID_1209	AN8259
n/a					Oxidosqualene-lanosterol cyclase	prot_ID_389	AN11065
n/a					SGT1 and CS domain protein	prot_ID_256	AN11071
n/a					Protein of unknown function	prot_ID_1439	AN12206
n/a				hstA	histone deacetylase	prot_ID_521	AN11067
n/a				phoA	Cyclin-dependent protein kinase Secretin-like G-protein coupled	prot_ID_806	AN8261
n/a				gprH	receptor	prot_ID_204	AN8262
n/a					Protein of unknown function	prot_ID_947	AN8263

AN11080 cluster

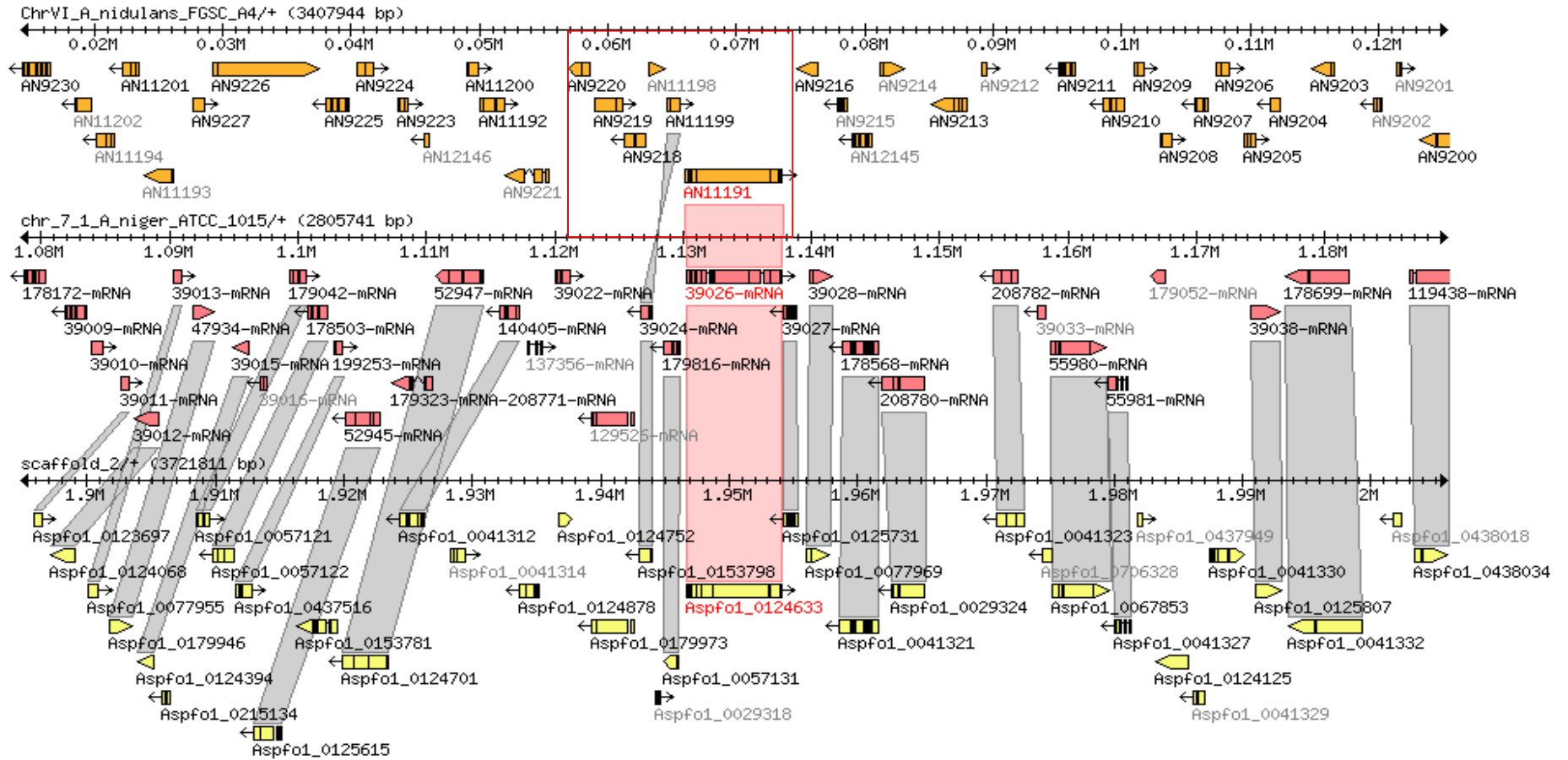


AN11080 cluster

Gene id (SMURF)*	Gene positions	Gene distance (SMURF)	Annotated_gene_function	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Glucan 1,3-beta-glucosidase			
n/a					Chitinase	prot_ID_121	AN8481	
n/a					Protein of unknown function DMATS-type aromatic prenyltransferase	prot_ID_877	AN11082	IGD, FA
n/a						prot_ID_782	AN11080	ECS
n/a					Protein of unknown function	prot_ID_224	AN8483	
n/a					Protein of unknown function	prot_ID_1048	AN11877	
n/a					GPI-anchored protein	prot_ID_797	AN8484	

AN11191 Cluster

Adjacent clusters, see AN11194 cluster below

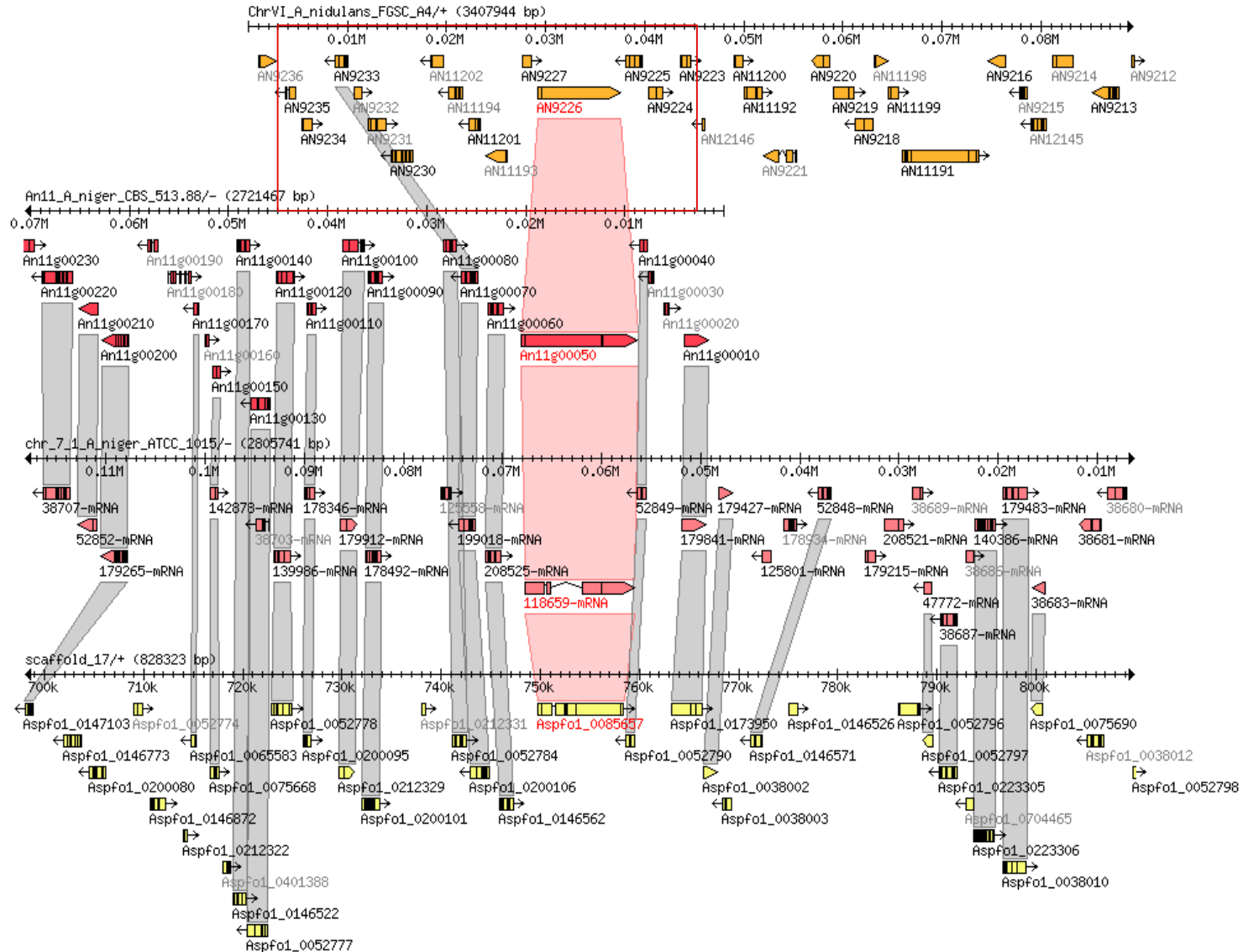


AN11191 Cluster

Gene id (SMURF)*	Gene positions	Gene distance (SMURF)	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID
n/a					extracellular guanyl-specific ribonuclease	n/a	
n/a					Protein of unknown function	n/a	
n/a					Protein of unknown function	n/a	
AN9210.3	8	797	conserved hypothetical protein	CYP662A1	Cytochrome P450	n/a	
AN9211.3	7	3682	conserved hypothetical protein		Protein of unknown function	n/a	
AN11645.3	6	1849	predicted protein		Deleted by the Broad	n/a	
AN9212.3	5	1255	hypothetical protein		Protein of unknown function	prot_ID_1018	AN9212
AN9213.3	4	987	conserved hypothetical protein		Hydrolase	prot_ID_516	AN9213
AN9214.3	3	2570	conserved hypothetical protein	CYP550B2	Cytochrome P450	prot_ID_27	AN9214
n/a					Protein of unknown function	prot_ID_1153	AN12145
AN9215.3	2	1507	hypothetical protein		Protein of unknown function	prot_ID_622	AN9215
AN9216.3	1	992	conserved hypothetical protein		Protein of unknown function	prot_ID_135	AN9216
AN11191.3	0	0	polyketide synthase		Polyketide synthase	prot_ID_589	AN11191 ECS, EP
AN11199.3	-1	408	conserved hypothetical protein		Dihydrofolate reductase	prot_ID_1032	AN11199
AN11198.3	-2	104	conserved hypothetical protein		Oxidoreductase	prot_ID_425	AN11198
AN9218.3	-3	187	hypothetical protein	CYP540D1	Cytochrome P450	prot_ID_234	AN9218
AN9219.3	-4	313	conserved hypothetical protein		Transmembrane transporter	prot_ID_835	AN9219
AN9220.3	-5	673	conserved hypothetical protein		Protein of unknown function	prot_ID_1014	AN9220 EP
AN9221.3	-6	1683	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	prot_ID_511	AN9221
AN11192.3	-7	48	conserved hypothetical protein	CYP664A1	Cytochrome P450	prot_ID_108	AN11192
n/a			conserved hypothetical protein		Protein of unknown function	prot_ID_329	AN11200
n/a					Protein of unknown function	prot_ID_1129	AN12146
n/a					Demethylsterigmatocystin 6-O-methyltransferase with a predicted role in sterigmatocystin/aflatoxin biosynthesis		AN9223
n/a					Domain(s) with predicted monooxygenase activity and role in oxidation-reduction process	n/a	AN9224
n/a					Putative cytochrome P450	n/a	AN9225
n/a					Putative nonribosomal peptide	n/a	AN9226

n/a	synthase (NRPS) Ortholog(s) have dioxygenase activity n/a and role in secondary metabolite biosynthetic process		AN9227
n/a	Domain(s) with predicted oxygen transporter activity and role in transport	n/a	AN11193
n/a	Domain(s) with predicted oxidoreductase activity and role in carotenoid biosynthetic process, chlorophyll biosynthetic process, oxidation-reduction process, photosynthesis	n/a	AN11201
n/a	Putative dimethyl-allyl-tryptophan synthase (dmats) type aromatic prenyltransferase	n/a	AN11194
n/a	Putative dimethyl-allyl-tryptophan synthase (DMATS) type aromatic prenyltransferase	n/a	AN11202
n/a	Domain(s) with predicted monooxygenase activity and role in oxidation-reduction process	n/a	AN9230

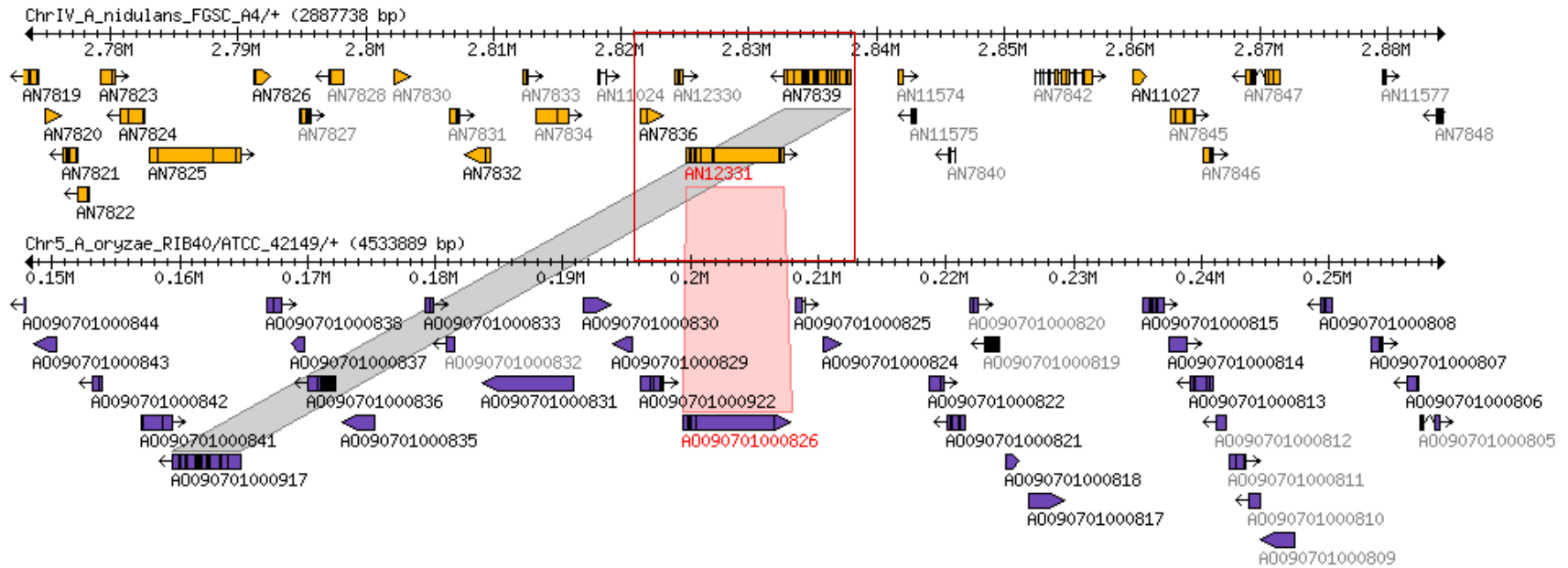
AN11194 cluster



AN11194 cluster

Gene id (SMURF)*	Gene positions	Gene distance (SMURF)	Annotated_gene_function	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	prot_ID_1014	AN9220	
n/a					Zn(II)2Cys6 transcription factor	prot_ID_511	AN9221	
n/a				CYP664A1	Cytochrome P450	prot_ID_108	AN11192	
n/a					Protein of unknown function	prot_ID_329	AN11200	
n/a					Protein of unknown function	prot_ID_1129	AN12146	
AN9223.3	7	1736	conserved hypothetical protein		Demethylsterigmatocystin 6-O-methyltransferase	prot_ID_620	AN9223	EP
AN9224.3	6	633	conserved hypothetical protein		Monooxygenase	prot_ID_133	AN9224	
AN9225.3	5	563	conserved hypothetical protein	CYP679A1	Cytochrome P450	prot_ID_726	AN9225	
AN9226.3	4	1045	nonribosomal peptide synthase		Nonribosomal peptide synthase	prot_ID_231	AN9226	
AN9227.3	3	616	conserved hypothetical protein		Dioxygenase	prot_ID_832	AN9227	
AN11193.3	2	429	conserved hypothetical protein		Domain(s) with predicted oxygen transporter activity	prot_ID_698	AN11193	
AN11201.3	1	611	conserved hypothetical protein		Oxidoreductase	prot_ID_933	AN11201	
AN11194.3	0	0	DMATS type aromatic prenyltransferase		DMATS-type aromatic prenyltransferase	prot_ID_210	AN11194	
AN11202.3	-1	363	DMATS type aromatic prenyltransferase		DMATS-type aromatic prenyltransferase	prot_ID_438	AN11202	
AN9230.3	-2	1866	conserved hypothetical protein		Monooxygenase	prot_ID_18	AN9230	
AN9231.3	-3	208	conserved hypothetical protein		UDP-N-acetylmuramate dehydrogenase	prot_ID_617	AN9231	
AN9232.3	-4	666	conserved hypothetical protein		Oxidoreductase	prot_ID_129	AN9232	
AN9233.3	-5	406	conserved hypothetical protein		O-methyltransferase	prot_ID_724	AN9233	
AN9234.3	-6	2320	conserved hypothetical protein		Oxidoreductase	prot_ID_227	AN9234	
AN9235.3	-7	638	conserved hypothetical protein		Isochorismatase family hydrolase	prot_ID_830	AN9235	EP
AN9236.3	-8	895	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	prot_ID_336	AN9236	
n/a					Protein of unknown function	n/a	AN12146	

AN12331 cluster

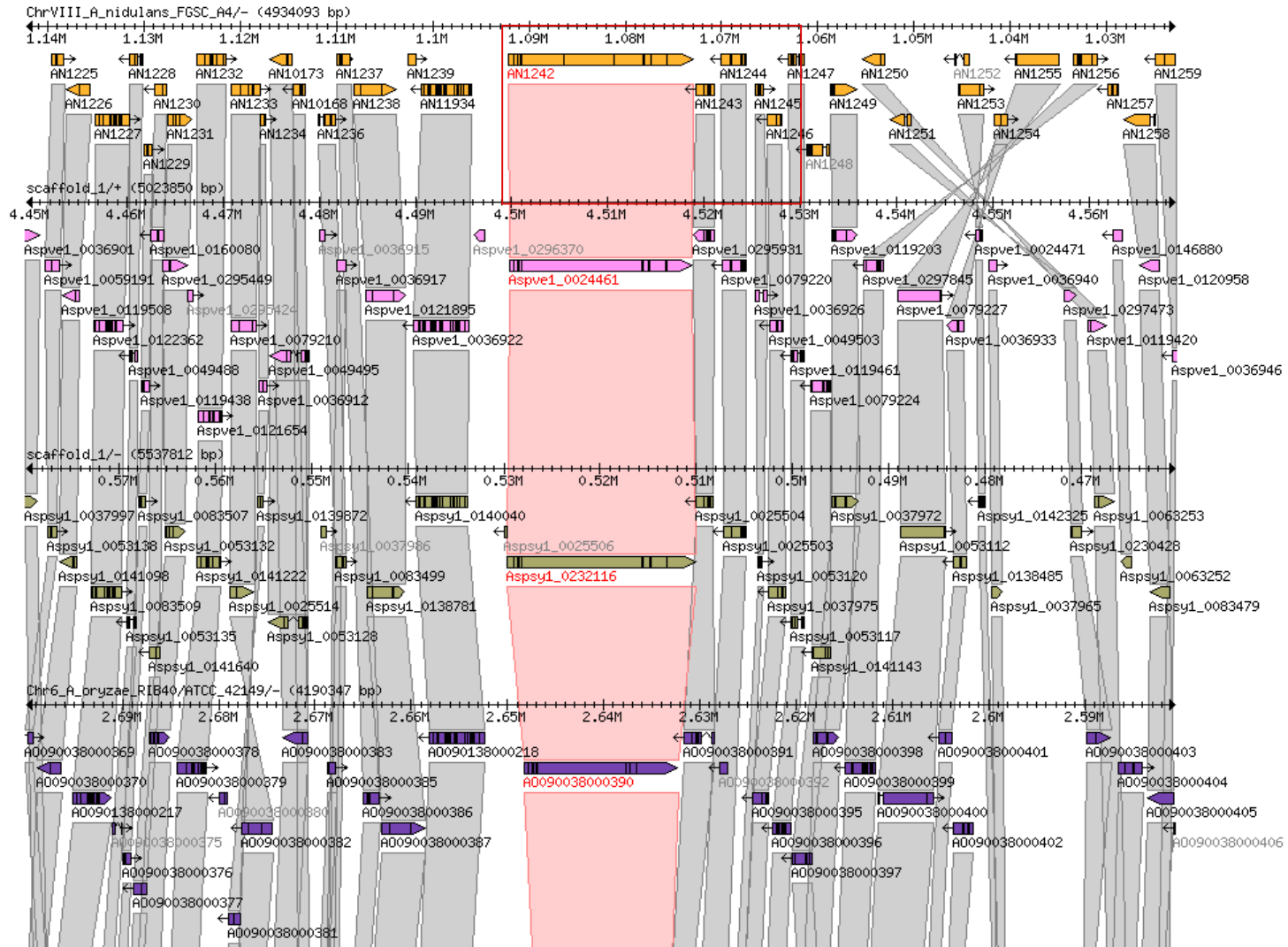


AN12331 cluster

Gene id (SMURF)*	Gene positions	Gene distance (SMURF)	Annotated_gene_function	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	prot_ID_35	AN7831	
n/a					choline dehydrogenase	prot_ID_544	AN7832	
n/a					Protein of unknown function	prot_ID_122	AN7833	
n/a					Protein of unknown function	prot_ID_631	AN7834	
n/a					Transmembrane transporter	prot_ID_337	AN11024	
n/a					Protein of unknown function	prot_ID_720	AN7836	FA
n/a					Protein of unknown function	prot_ID_996	AN12330	
n/a					PKS-like enzyme	prot_ID_957	AN12331	
n/a					Transmembrane transporter	prot_ID_392	AN7839	ECS
n/a					Protein of unknown function	prot_ID_593	AN11574	
n/a					Protein of unknown function	prot_ID_175	AN11575	
n/a					Protein of unknown function	prot_ID_541	AN7840	
n/a					Protein of unknown function	prot_ID_630	AN7842	

AN1242 cluster

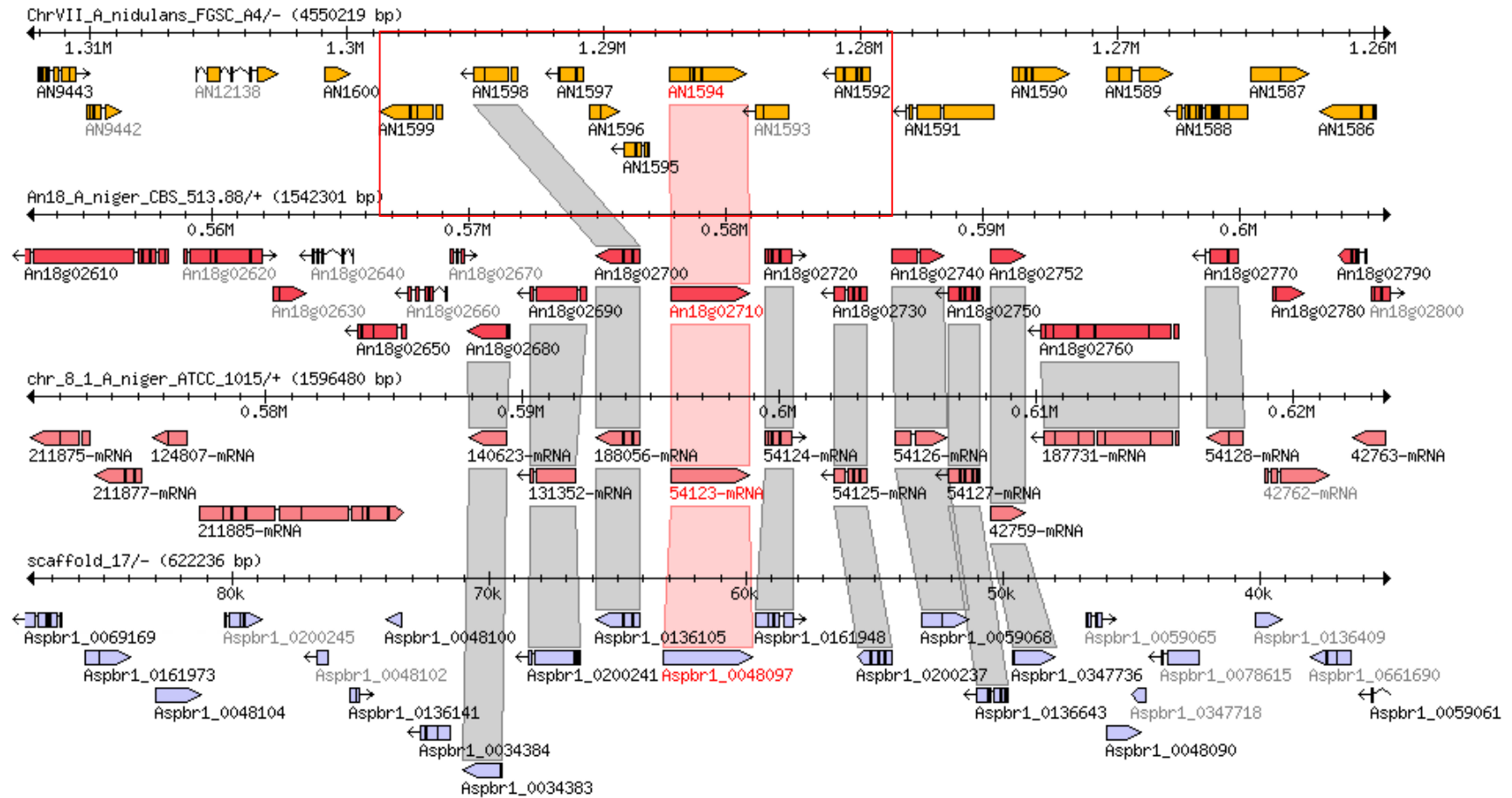
Highly conserved across numerous species



AN1242 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	prot_ID_336	AN1236	
n/a				uvsC	DNA damage response protein	prot_ID_791	AN1237	
n/a				nup120	nuclear pore complex protein	prot_ID_1268	AN1238	
n/a					Protein of unknown function	prot_ID_43	AN1239	
n/a					Transmembrane transporter	prot_ID_1703	AN11934	
AN1242.3	0	0	nonribosomal peptide synthase conserved hypothetical protein		Nonribosomal peptide synthase	prot_ID_260	AN1242	ECS, IGD
AN1243.3	-1	259			Transmembrane transporter	prot_ID_711	AN1243	
n/a					Protein of unknown function	prot_ID_1182	AN1244	
n/a					Protein of unknown function	prot_ID_1637	AN1245	
n/a				pgkA	phosphoglycerate kinase	prot_ID_417	AN1246	
n/a					integral membrane protein	prot_ID_874	AN1247	ECS
n/a					Protein of unknown function	prot_ID_1350	AN1248	
n/a					Formin binding protein	prot_ID_121	AN1249	
n/a					Protein of unknown function	prot_ID_1096	AN1250	

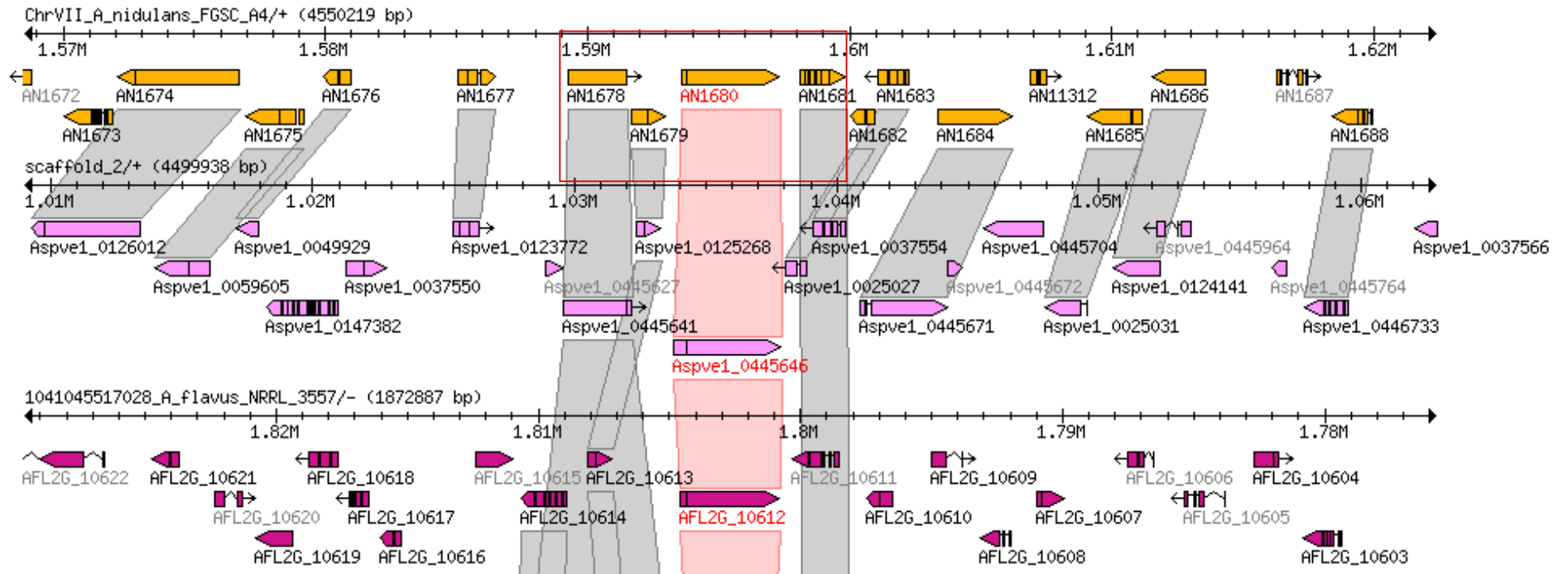
AN1594 (PbcR) cluster



**AN1594 (PbcR)
cluster**

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					GGPP-synthase	n/a	AN1592	EP
n/a					3-hydroxy-3-methylglutaryl-coenzyme A (HMG-CoA) reductase isozyyme	n/a	AN1593	
n/a					Entkaurene synthase	n/a	AN1594	
n/a					Elongation factor 1-gamma	n/a	AN1595	
n/a					Short-chain dehydrogenase	n/a	AN1596	
n/a					Protein of unknown function	n/a	AN1597	
n/a				CYP503B1	Cytochrome P450 Zn(II)(2)Cys(6)-type	n/a	AN1598	
n/a				pbcR	transcription factor	n/a	AN1599	EP

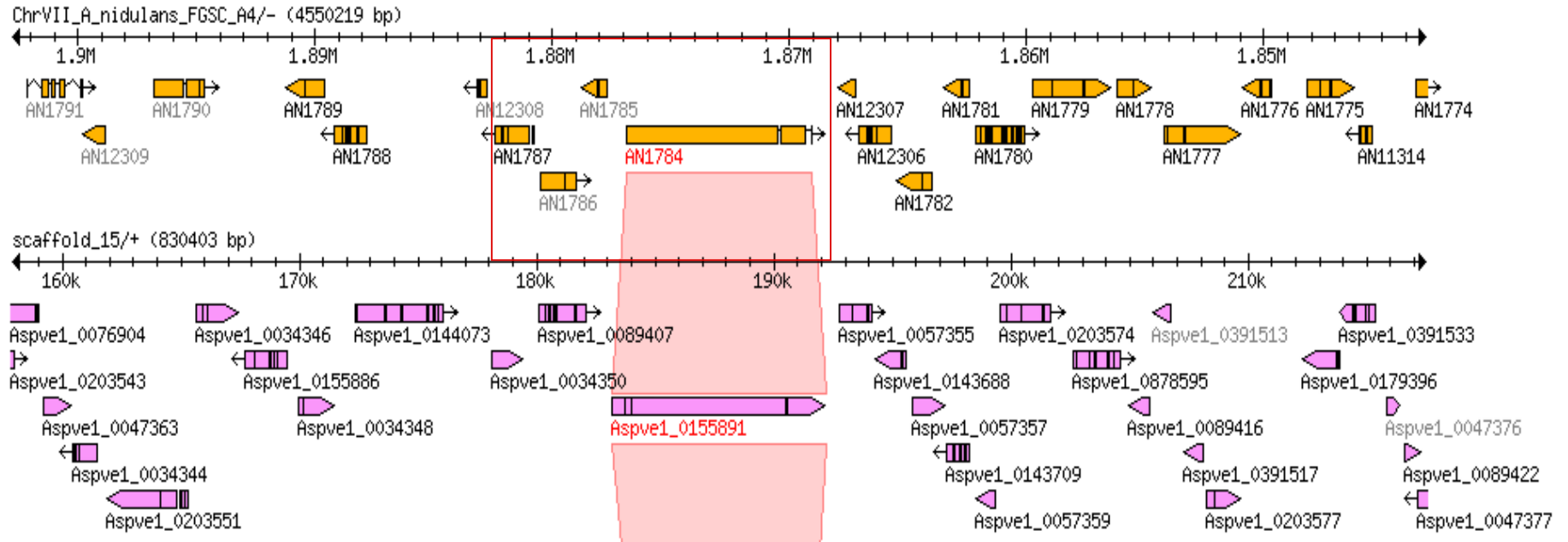
AN1680 cluster



AN1680 Cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Domain(s) with predicted DNA binding activity and intracellular localization	prot_ID_478	AN1674	
n/a					Lysophospholipase (phospholipase B)	prot_ID_1290	AN1675	
n/a					Oxidoreductase	prot_ID_619	AN1676	
AN1677.3	3	2761	conserved hypothetical protein		Short-chain dehydrogenase	prot_ID_1433	AN1677	
AN1678.3	2	398	conserved hypothetical protein		Transcription factor	prot_ID_764	AN1678	ECS
AN1679.3	1	609	conserved hypothetical protein		Protein of unknown function	prot_ID_95	AN1679	
AN1680.3	0	0	NRPS-like enzyme		Nonribosomal peptide synthase (NRPS)-like enzyme	prot_ID_331	AN1680	
AN1681.3	-1	735	conserved hypothetical protein		Transmembrane transporter	prot_ID_1145	AN1681	ECS
AN1682.3	-2	151	hypothetical protein		Protein of unknown function	prot_ID_476	AN1682	
AN1683.3	-3	192	conserved hypothetical protein		oligosaccharyltransferase delta subunit	prot_ID_1287	AN1683	
AN1684.3	-4	840	conserved hypothetical protein		Protein of unknown function	prot_ID_618	AN1684	
AN11312.3	-5	853	conserved hypothetical protein		Protein of unknown function	prot_ID_964	AN11312	
AN1685.3	-6	1871	3-phytase B precursor		phytase	prot_ID_1432	AN1685	
AN1686.3	-7	903	conserved hypothetical protein		Transcription factor	prot_ID_762	AN1686	
AN1687.3	-8	2110	hypothetical protein		Oxidoreductase	prot_ID_93	AN1687	
AN1688.3	-9	931	conserved hypothetical protein		Protein of unknown function	n/a	AN1688	
AN1689.3	-10	3063	hypothetical protein		Oxidoreductase	n/a	AN1689	
AN1690.3	-11	589	hypothetical protein		Protein of unknown function	n/a	AN1690	
AN1691.3	-12	955	conserved hypothetical protein		Transmembrane transporter	n/a	AN1691	

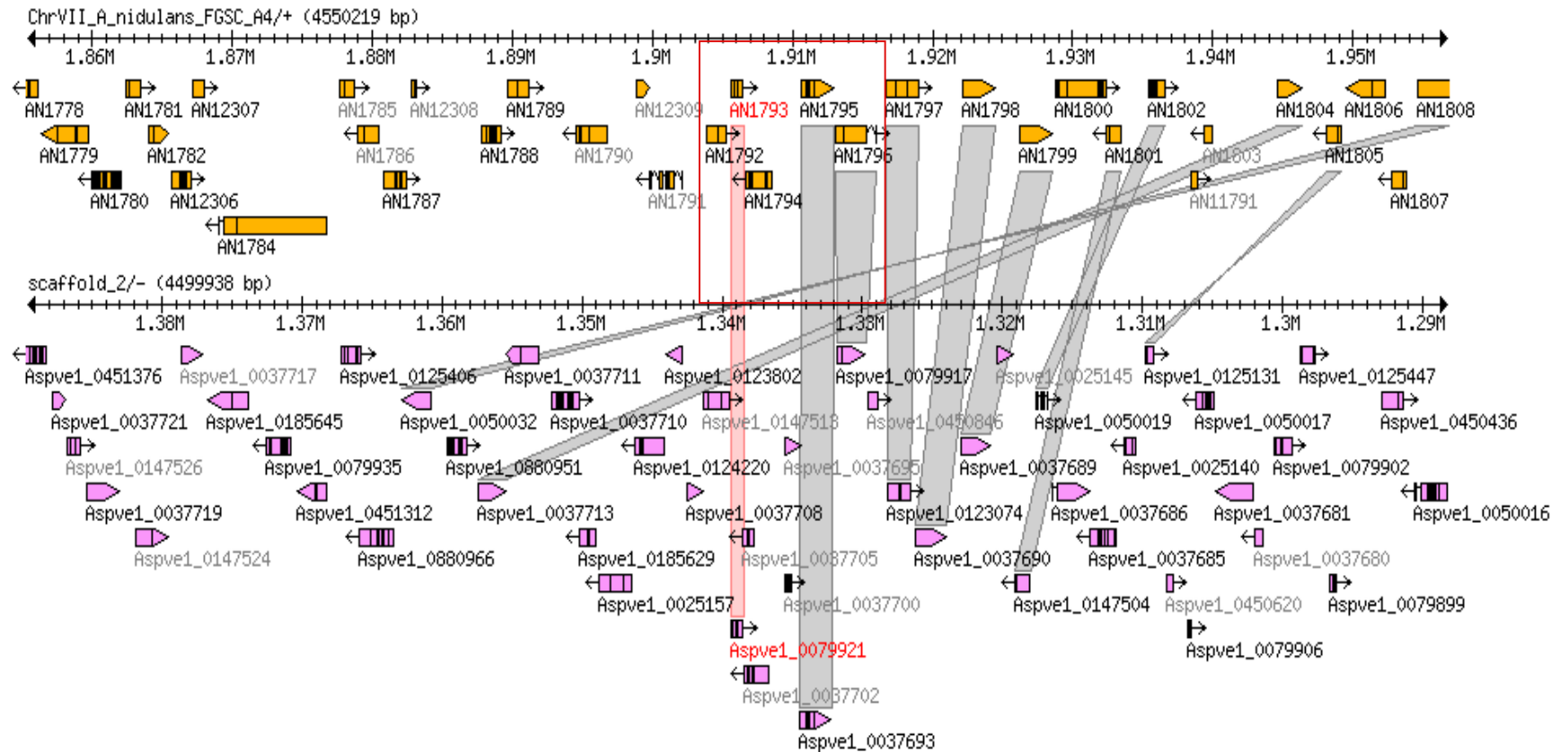
AN1784 cluster



AN1784 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID
n/a					U1 snRNP splicing complex subunit	prot_ID_856	AN1776
n/a					PHD finger domain protein	prot_ID_180	AN1777
AN1778.3	6	242	conserved hypothetical protein	pantoB	Ketopentolate hydroxymethyl transferase	prot_ID_1000	AN1778
AN1779.3	5	399	conserved hypothetical protein		Protein kinase	prot_ID_326	AN1779
AN1780.3	4	520	conserved hypothetical protein		Aminopeptidase	prot_ID_565	AN1780
AN1781.3	3	569	conserved hypothetical protein		Oxidoreductase	prot_ID_1381	AN1781
AN1782.3	2	653	conserved hypothetical protein		Hydrolase	prot_ID_713	AN1782
n/a					Oxidoreductase	prot_ID_1537	AN12306
AN1783.3	1	690	conserved hypothetical protein		Protein of unknown function	prot_ID_1512	AN12307
AN1784.3	0	0	polyketide synthase		Polyketide synthase	prot_ID_855	AN1784 EP
AN1785.3	-1	793	conserved hypothetical protein		Protein of unknown function	prot_ID_178	AN1785
AN1786.3	-2	127	conserved hypothetical protein		Monooxygenase	prot_ID_998	AN1786
AN1787.3	-3	272	conserved hypothetical protein		UDP-N-acetylmuramate dehydrogenase	prot_ID_323	AN1787 EP
n/a					Protein of unknown function	prot_ID_1548	AN12308
n/a					Metal ion transmembrane transporter	prot_ID_1139	AN1788
n/a					Protein serine/threonine kinase	prot_ID_469	AN1789
n/a					Protein of unknown function	prot_ID_711	AN1790

AN1793 cluster



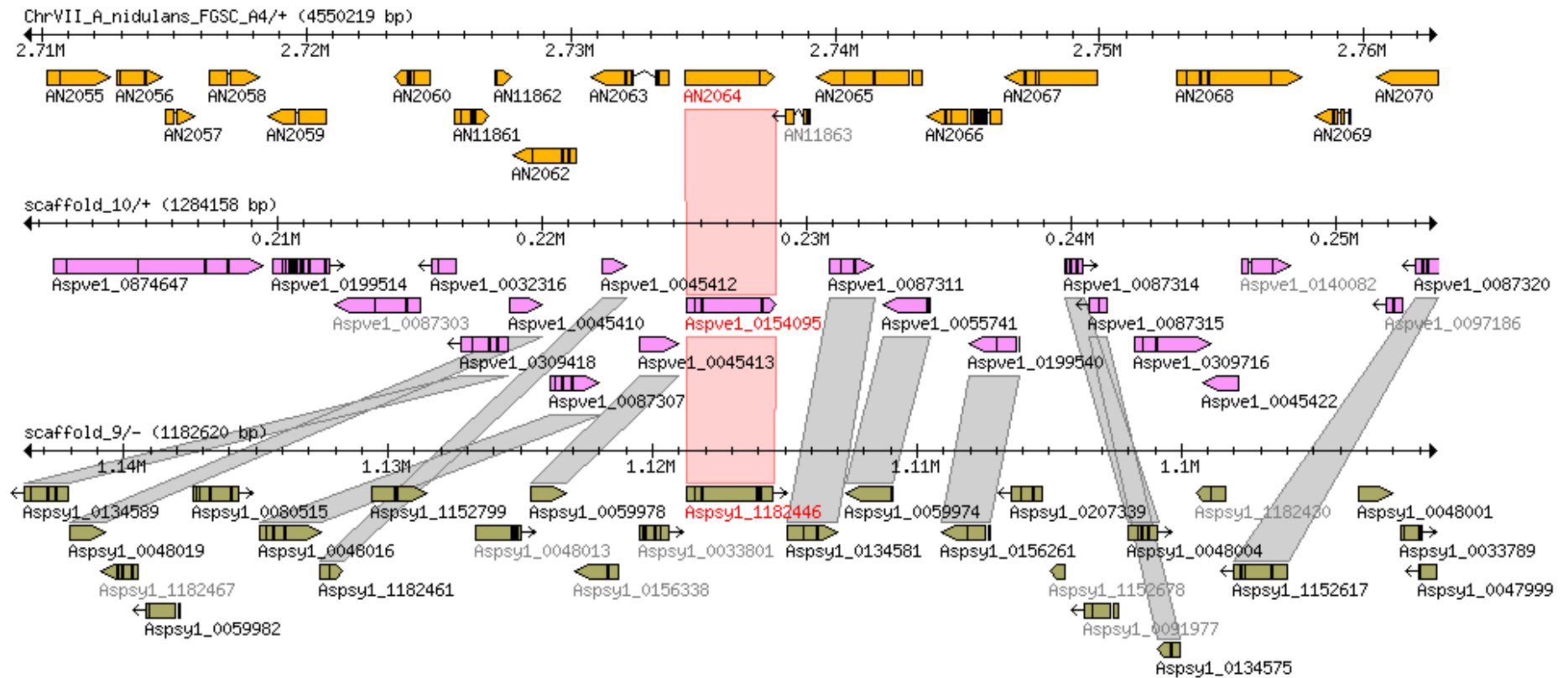
AN1793 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	prot_ID_711	AN1790	
n/a					Protein of unknown function	prot_ID_1520	AN12309	
n/a					Protein of unknown function	prot_ID_38	AN1791	
n/a					Hydrolase	prot_ID_853	AN1792	FA
n/a					Terpene synthase	prot_ID_176	AN1793	
n/a				CYP682D1	Cytochrome P450	prot_ID_997	AN1794	
n/a					Transmembrane transporter	prot_ID_321	AN1795	
n/a					DNA repair protein	prot_ID_1137	AN1796	ECS
n/a					Sugar transporter	n/a	AN1797	
n/a					Sterol esterase	n/a	AN1798	
n/a					Triglyceride lipase	n/a	AN1799	
n/a					Transmembrane histidine kinase	n/a	AN1800	
n/a					Protein of unknown function	n/a	AN1801	
n/a					Small nuclear ribonucleoprotein	n/a	AN1802	

AN2064 cluster

Possible false positive, functional annotations don't make sense

No manual prediction made

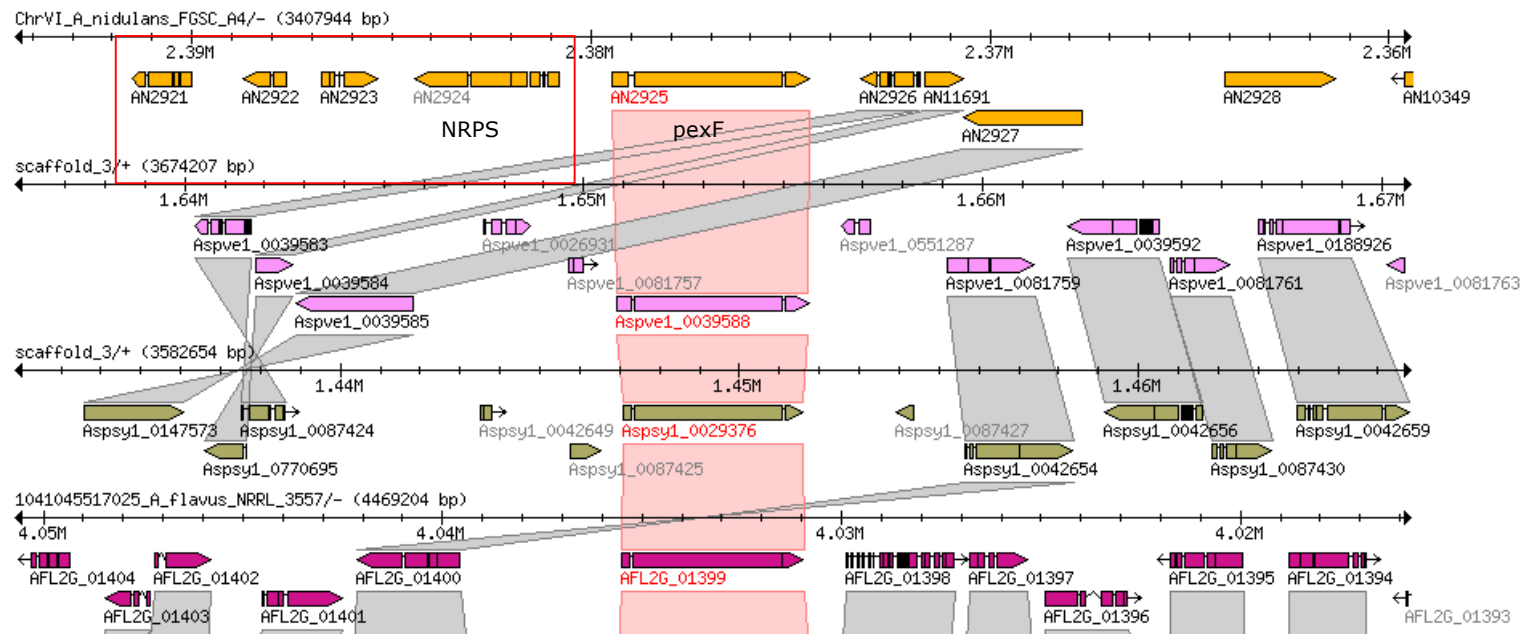


AN2064 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID
n/a					50S ribosomal protein L12	prot_ID_86	AN2057
n/a					Protein of unknown function	prot_ID_908	AN2058
n/a				velC	Velvet family protein	prot_ID_232	AN2059
n/a				abxA	Exo-arabinanase	prot_ID_468	AN2060
n/a					oxidoreductase, transferring acyl groups	prot_ID_1485	AN11861
AN2061.3	3	26	conserved hypothetical protein		Deleted ORF		
n/a					Ortholog(s) have TRC complex, nucleus localization	prot_ID_1547	AN11862
AN2062.3	2	442	hypothetical protein similar to bipA	bipA	ER-resident chaperone of the HSP70 family	prot_ID_610	AN2062

AN2924 cluster

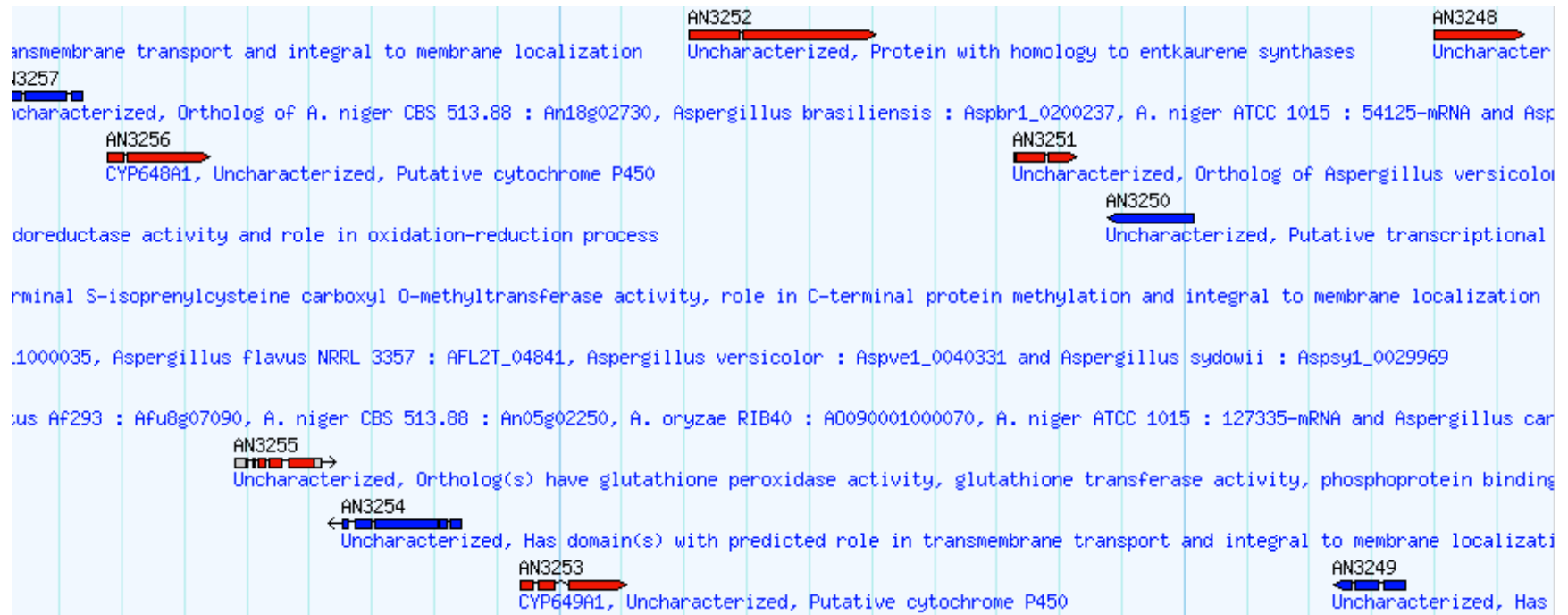
Possible false positive prediction



AN2924 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Similar to 26S proteasome regulatory subunit	prot_ID_127	AN2917	
n/a				cct4	Chaperonin complex component C2H2 zinc-finger transcription factor	prot_ID_722	AN2918	
n/a				sltA		prot_ID_228	AN2919	
n/a				AN2920	Possible pseudogene			
AN2921.3	3	544	conserved hypothetical protein		Domain(s) with predicted nucleotide binding activity	prot_ID_1008	AN2921	EP
AN2922.3	2	1096	conserved hypothetical protein		Protein of unknown function	prot_ID_504	AN2922	
AN2923.3	1	951	conserved hypothetical protein		Protein of unknown function	prot_ID_16	AN2923	
AN2924.3	0	0	NRPS-like enzyme		NRPS-like enzyme	prot_ID_611	AN2924	EP
AN2925.3	-1	1615	conserved hypothetical protein	pexF	peroxisomal import protein	prot_ID_124	AN2925	
n/a				nsa2	60S ribosomal protein	prot_ID_719	AN2926	
n/a					Protein serine/threonine kinase	prot_ID_224	AN2927	
n/a					Protein of unknown function	prot_ID_1107	AN11691	
n/a					Protein of unknown function	prot_ID_827	AN2928	

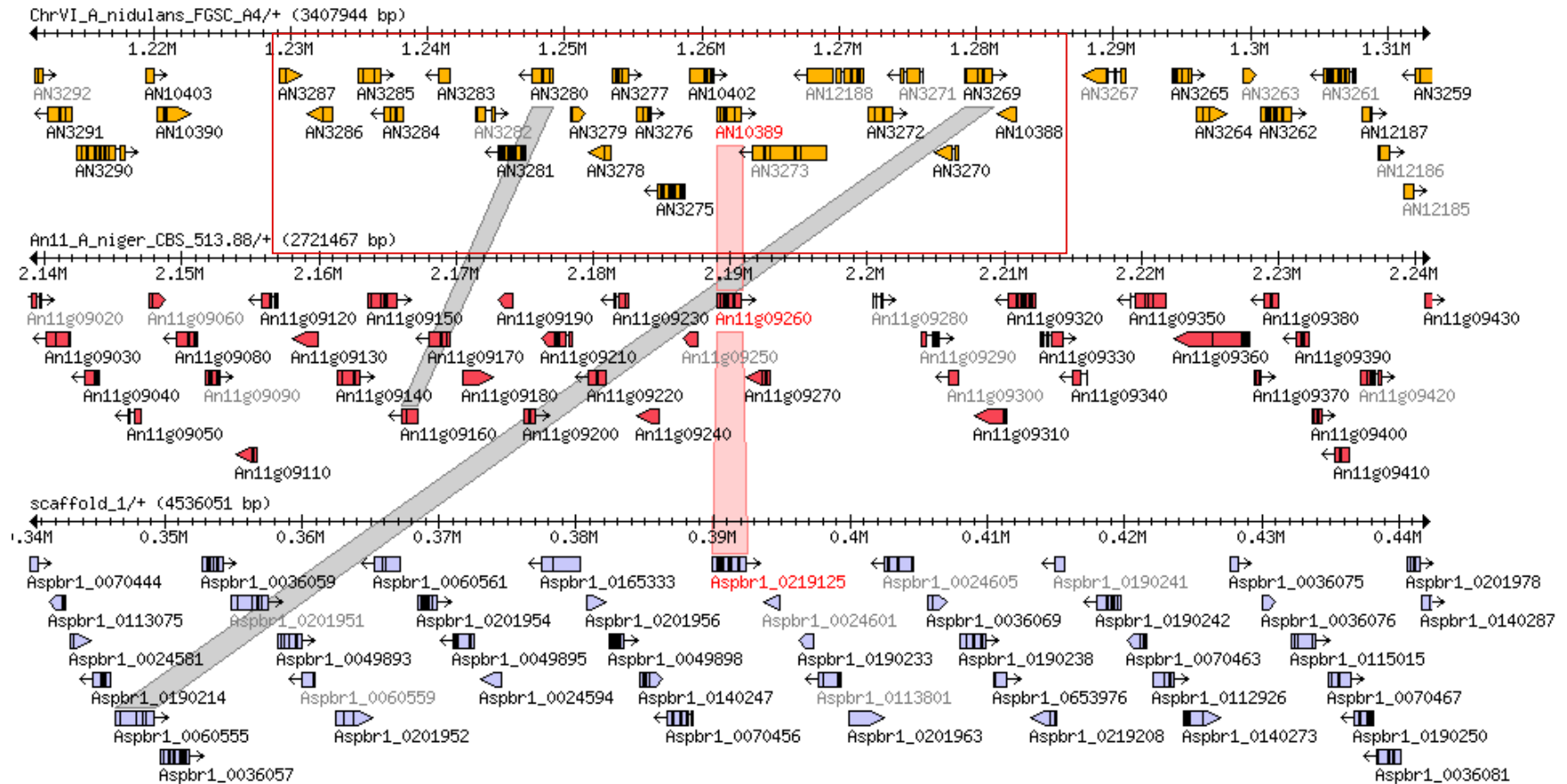
AN3252 cluster



AN3252 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	n/a	AN3257	EP
n/a				CYP648A1	cytochrome P450	n/a	AN3256	
n/a					glutathione peroxidase	n/a	AN3255	
n/a					transmembrane transporter	n/a	AN3254	
n/a				CYP649A1	cytochrome P450	n/a	AN3253	
n/a					Entkaurene synthase	n/a	AN3252	EP

AN3273 cluster

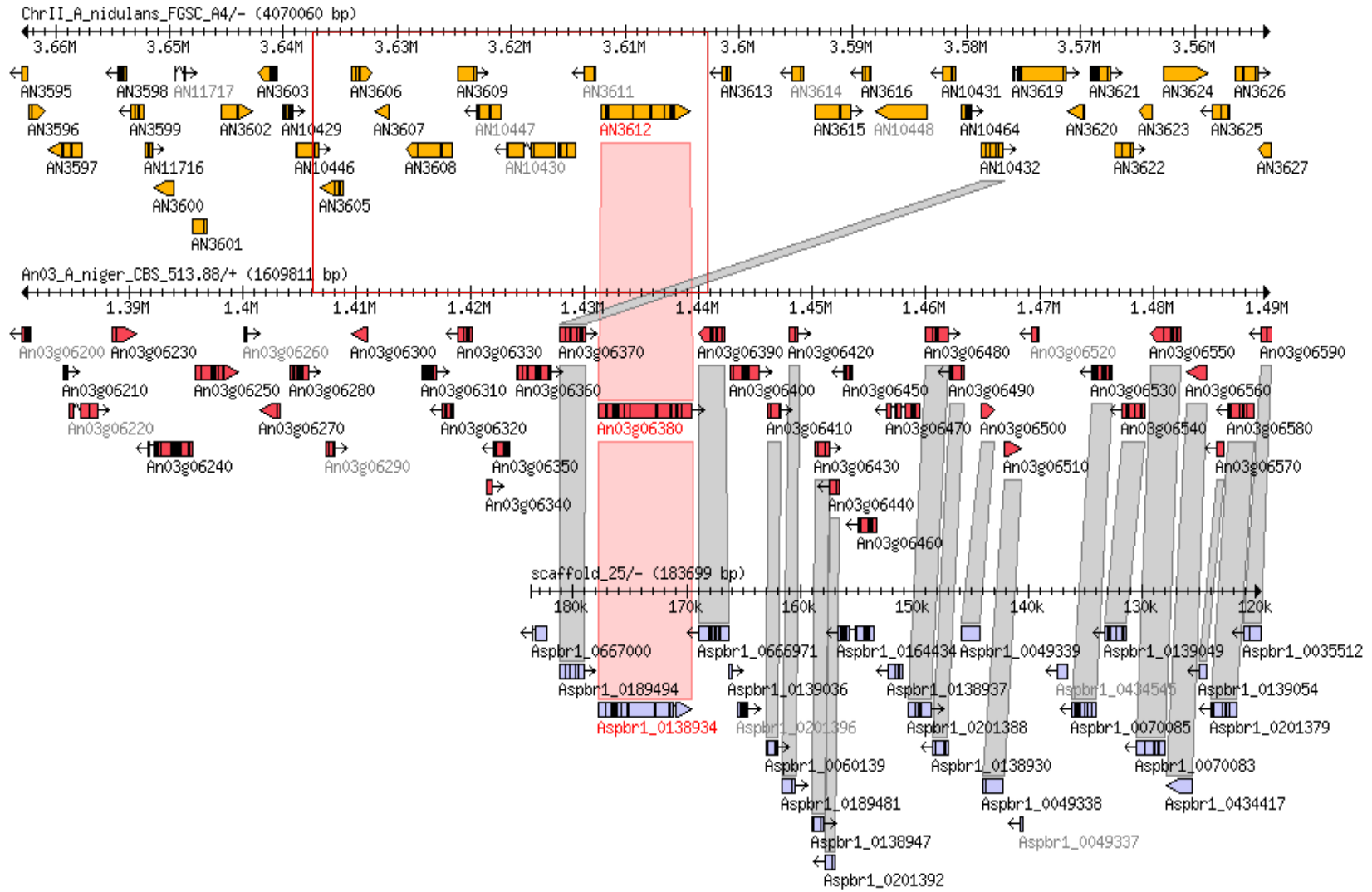


AN3273 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	prot_ID_773	AN3267	
n/a					UDP-N-acetylmuramate dehydrogenase	prot_ID_420	AN10388	IGD
n/a				AN10387	possible psuedogene	n/a		
n/a					Zn(II)2Cys6 transcription factor	prot_ID_882	AN3269	
n/a					Transmembrane transporter	prot_ID_1066	AN3270	
n/a					Protein of unknown function	prot_ID_556	AN3271	
n/a				CYP667A1	Cytochrome P450	prot_ID_71	AN3272	
n/a					Transferase	prot_ID_1165	AN12188	
n/a					Polketide synthase	prot_ID_666	AN3273	
n/a				CYP654A1	Cytochrome P450	prot_ID_1028	AN10389	
n/a					UDP-N-acetylmuramate dehydrogenase	prot_ID_523	AN10402	
n/a				CYP567E1	Cytochrome P450	prot_ID_771	AN3275	
n/a					Type II fatty acid synthase	prot_ID_278	AN3276	
n/a					Terpene synthase	prot_ID_879	AN3277	
n/a					Protein of unknown function	prot_ID_387	AN3278	
n/a					Oxidoreductase	prot_ID_994	AN3279	
n/a					Zn(II)2Cys6 transcription factor	prot_ID_70	AN3280	
n/a				CYP567D1	Cytochrome P450	prot_ID_665	AN3281	
n/a					Protein of unknown function	prot_ID_177	AN3282	
n/a					Protein of unknown function	prot_ID_770	AN3283	
n/a					Protein of unknown function	prot_ID_277	AN3284	
n/a					Protein of unknown function	prot_ID_877	AN3285	
n/a					Protein of unknown function	n/a	AN3286	
n/a					Transmembrane transporter	n/a	AN3287	IGD

AN3612 cluster

overlaps AN10430 cluster

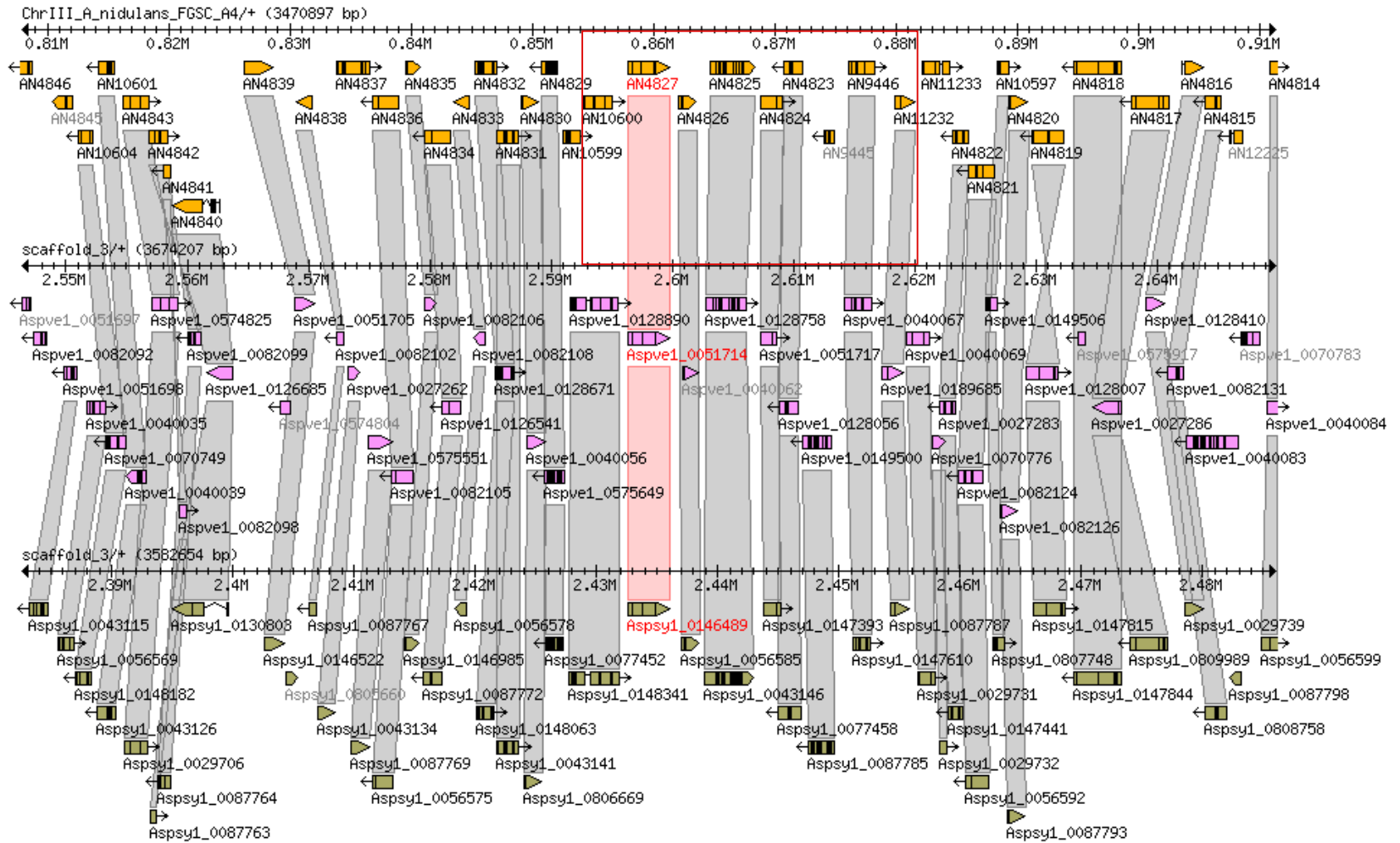


AN3612 cluster (overlaps AN10430 cluster)

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Phosphoserine phosphatase	prot_ID_665	AN10429	
n/a					Phosphoprotein phosphatase	prot_ID_59	AN10446	
n/a					Oxidoreductase	prot_ID_906	AN3605	FA
n/a					Protein of unknown function	prot_ID_296	AN3606	
n/a				lreB	Znc-finger transcription factor	prot_ID_1042	AN3607	
AN3608.3	5	506	hypothetical protein similar to ABC transporter protein AtrC	atrC	ABC transporter	prot_ID_423	AN3608	
AN3609.3	4	25	conserved hypothetical protein		Cytochrome P450	prot_ID_1168	AN3609	
AN10447.3	3	615	conserved hypothetical protein		Acyl transferase	prot_ID_789	AN10447	
AN10430.3	2	773	polyketide synthase		Polyketide synthase	prot_ID_886	AN10430	
AN3611.3	1	425	conserved hypothetical protein		Protein of unknown function	prot_ID_769	AN3611	
AN3612.3	0	0	polyketide synthase		Polyketide synthase	prot_ID_164	AN3612	ECS, FA
n/a				xlnA	Endo-1,4-beta-xylanase	prot_ID_903	AN3613	
n/a					Protein of unknown function	prot_ID_292	AN3614	
n/a					Nucleoside-triphosphatase	prot_ID_1039	AN3615	
n/a					Oxidoreductase	prot_ID_421	AN3616	
n/a				tprA	Tetratricopeptide repeat (TPR)-containing protein	prot_ID_186	AN10448	

AN4827 cluster

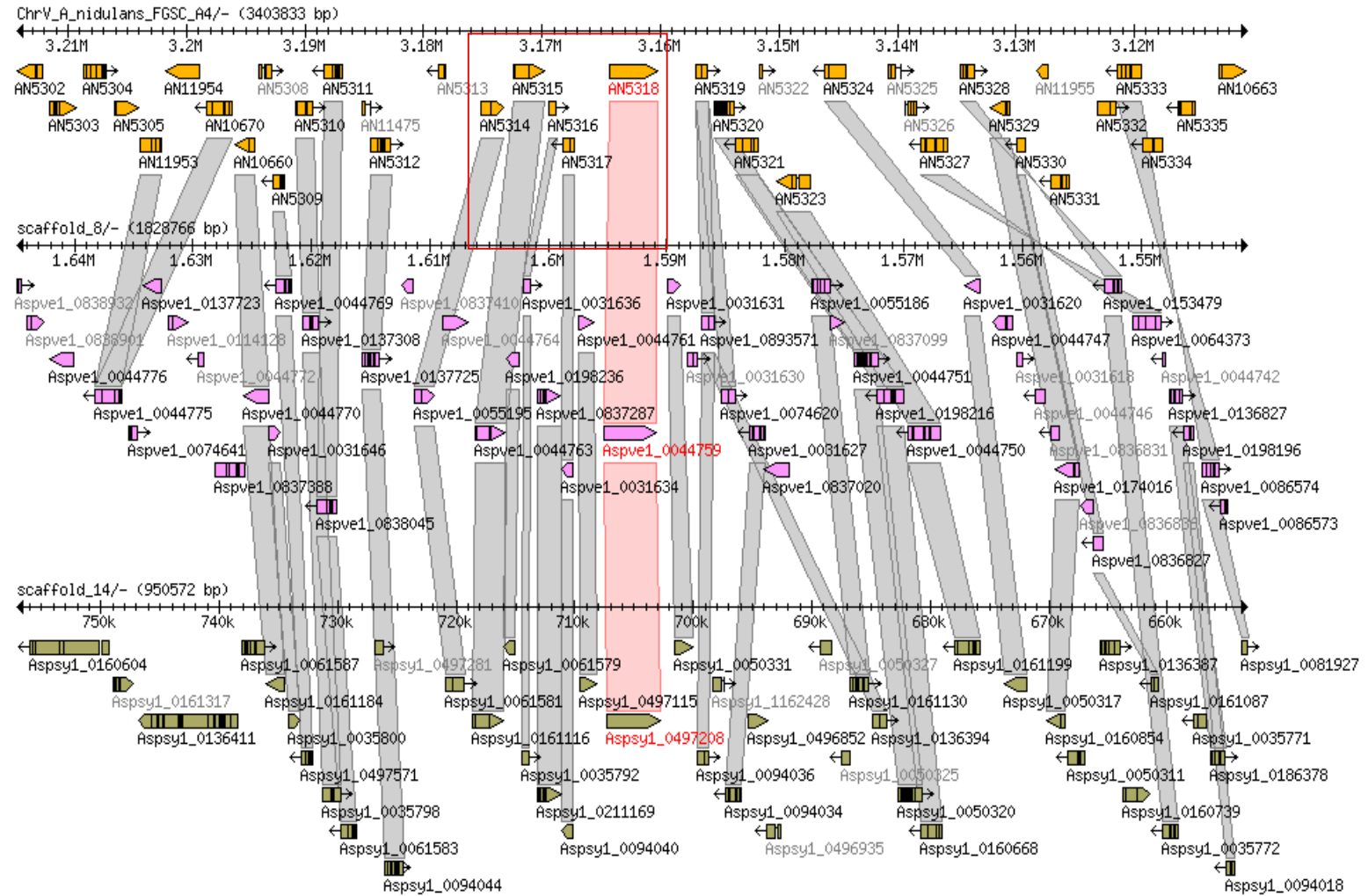
Functional annotations not related to secondary metabolism



AN4827 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Phosphatidylinositol:UDP-GlcNAc transferase PIG-C	prot_ID_780	AN11232	EP
n/a				panK	Pantothenate kinase	prot_ID_816	AN9446	
n/a					ATP-dependent helicase	prot_ID_187	AN9445	
AN4823.3	4	227	conserved hypothetical protein		Chitin deacetylase	prot_ID_371	AN4823	
AN4824.3	3	635	conserved hypothetical protein		Glycosyl transferase	prot_ID_1008	AN4824	
AN4825.3	2	1077	conserved hypothetical protein		Glucan 1,3-beta-glucosidase	prot_ID_485	AN4825	
AN4826.3	1	785	conserved hypothetical protein		Transmembrane transporter	prot_ID_1120	AN4826	
AN4827.3	0	0	NRPS-like enzyme		NRPS-like enzyme	prot_ID_590	AN4827	
AN10600.3	-1	1290	hypothetical protein		Zn(II)2Cys6 transcription factor	prot_ID_800	AN10600	EP
AN10599.3	-2	315	hypothetical protein		Mandelate racemase/muconate lactonizing enzyme family protein	prot_ID_384	AN10599	
AN4829.3	-3	519	hypothetical protein		Reductase with a predicted role in carbohydrate metabolism	prot_ID_701	AN4829	
AN4830.3	-4	222	conserved hypothetical protein		Phosphopantothenate-cysteine ligase	prot_ID_892	AN4830	
AN4831.3	-5	413	conserved hypothetical protein		Oxidoreductase	prot_ID_370	AN4831	
AN4832.3	-6	506	conserved hypothetical protein		Protein of unknown function	prot_ID_1007	AN4832	
AN4833.3	-7	632	conserved hypothetical protein		Hydrolase	prot_ID_484	AN4833	
AN11448.3	-8	317	predicted protein		Deleted by the Broad	n/a	AN11448	
AN4834.3	-9	636	conserved hypothetical protein		Protein of unknown function	prot_ID_1119	AN4834	
AN4835.3	-10	319	conserved hypothetical protein		Domain(s) with predicted role in cell division, chromosome segregation	prot_ID_589	AN4835	
AN4836.3	-11	494	conserved hypothetical protein		Ortholog(s) have Golgi apparatus localization	prot_ID_75	AN4836	
AN4837.3	-12	559	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	n/a	AN4837	

AN5318 cluster

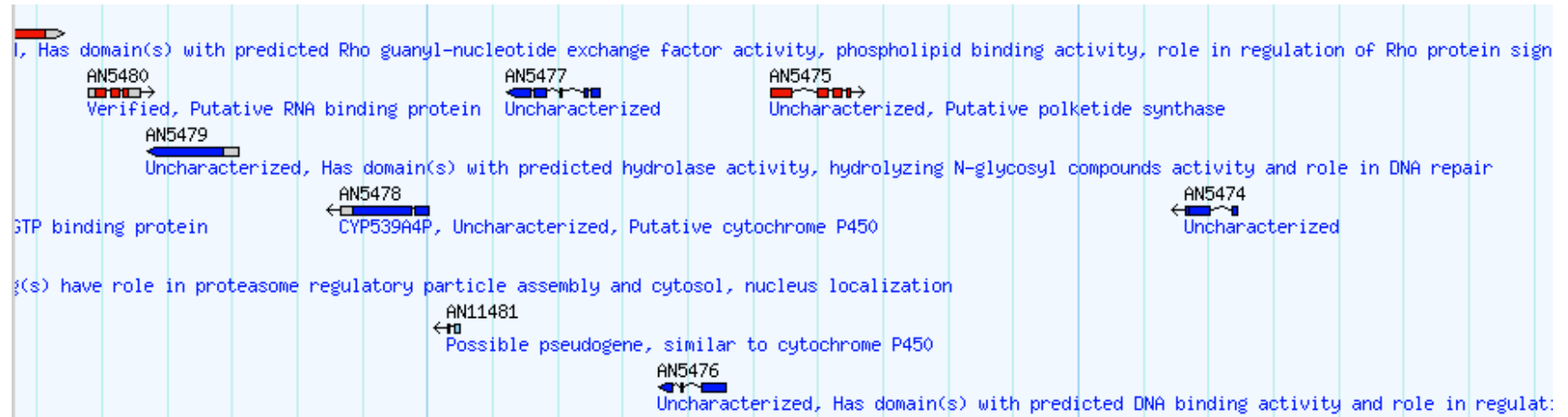


AN5318 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	prot_ID_137	AN5312	
n/a					Protein of unknown function	prot_ID_707	AN5313	
n/a					Domain(s) with predicted catalytic activity, pyridoxal phosphate binding	prot_ID_242	AN5314	ECS
n/a					Protein of unknown function	prot_ID_811	AN5315	
n/a					Protein of unknown function	prot_ID_342	AN5316	
AN5317.3	1	2716	conserved hypothetical protein		NmrA-like family protein	prot_ID_903	AN5317	
AN5318.3	0	0	NRPS-like enzyme		Non-ribosomal peptide synthetase	prot_ID_448	AN5318	ECS
AN5319.3	-1	3277	conserved hypothetical protein		Protein of unknown function	prot_ID_1006	AN5319	
AN5320.3	-2	475	conserved hypothetical protein		Hydrolase	prot_ID_134	AN5320	
AN5321.3	-3	105	conserved hypothetical protein		Triacylglycerol lipase	prot_ID_704	AN5321	
AN5322.3	-4	200	conserved hypothetical protein		Protein of unknown function	prot_ID_239	AN5322	
AN5323.3	-5	1143	hypothetical protein		Substrate-specific transmembrane transporter	prot_ID_809	AN5323	
AN5324.3	-6	1860	conserved hypothetical protein	dIpA	Dehydrin-like protein	prot_ID_339	AN5324	
AN5325.3	-7	3548	conserved hypothetical protein		Protein of unknown function	prot_ID_901	AN5325	
AN5326.3	-8	646	conserved hypothetical protein		Protein of unknown function	n/a	AN5326	
AN5327.3	-9	161	conserved hypothetical protein		GTPase	n/a	AN5327	
AN5328.3	-10	1031	conserved hypothetical protein		Oxidoreductase	n/a	AN5328	
AN5329.3	-11	1328	conserved hypothetical protein		Transmembrane transporter	n/a	AN5329	

AN5475 cluster

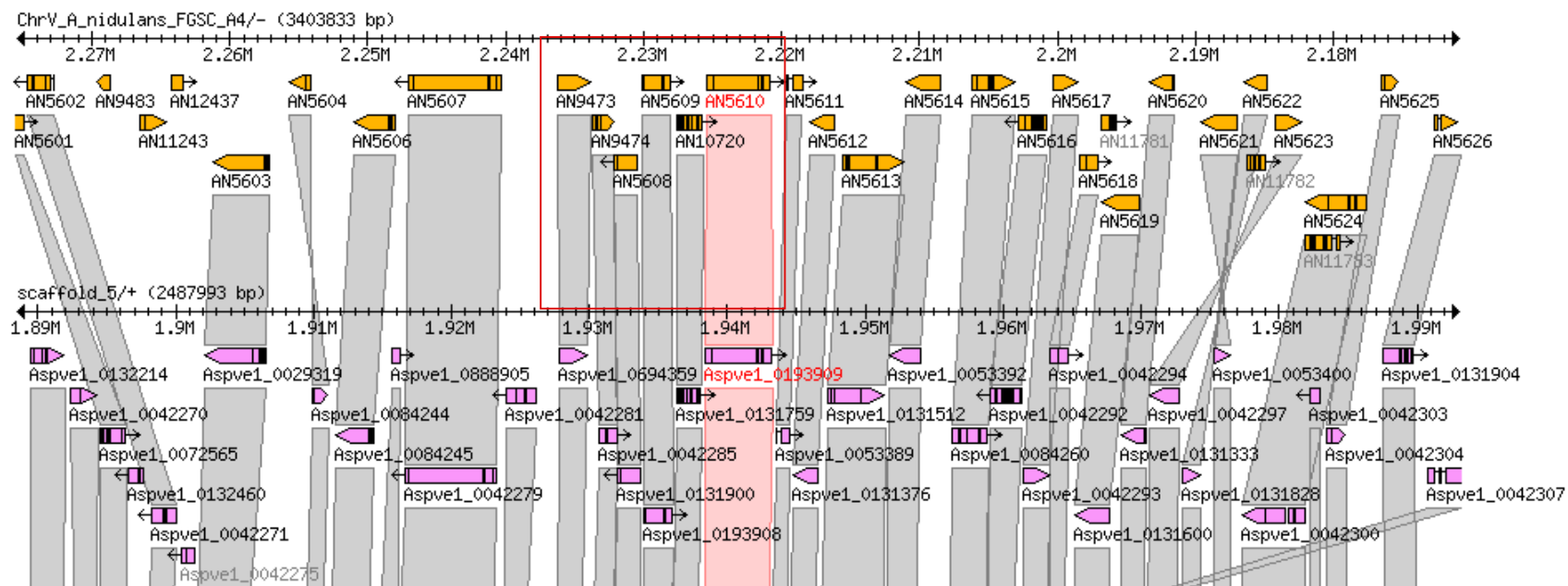
Possible orphan PKS, no boundary prediction by any method



AN5475 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID
n/a					Polyketide synthase	n/a	AN5475

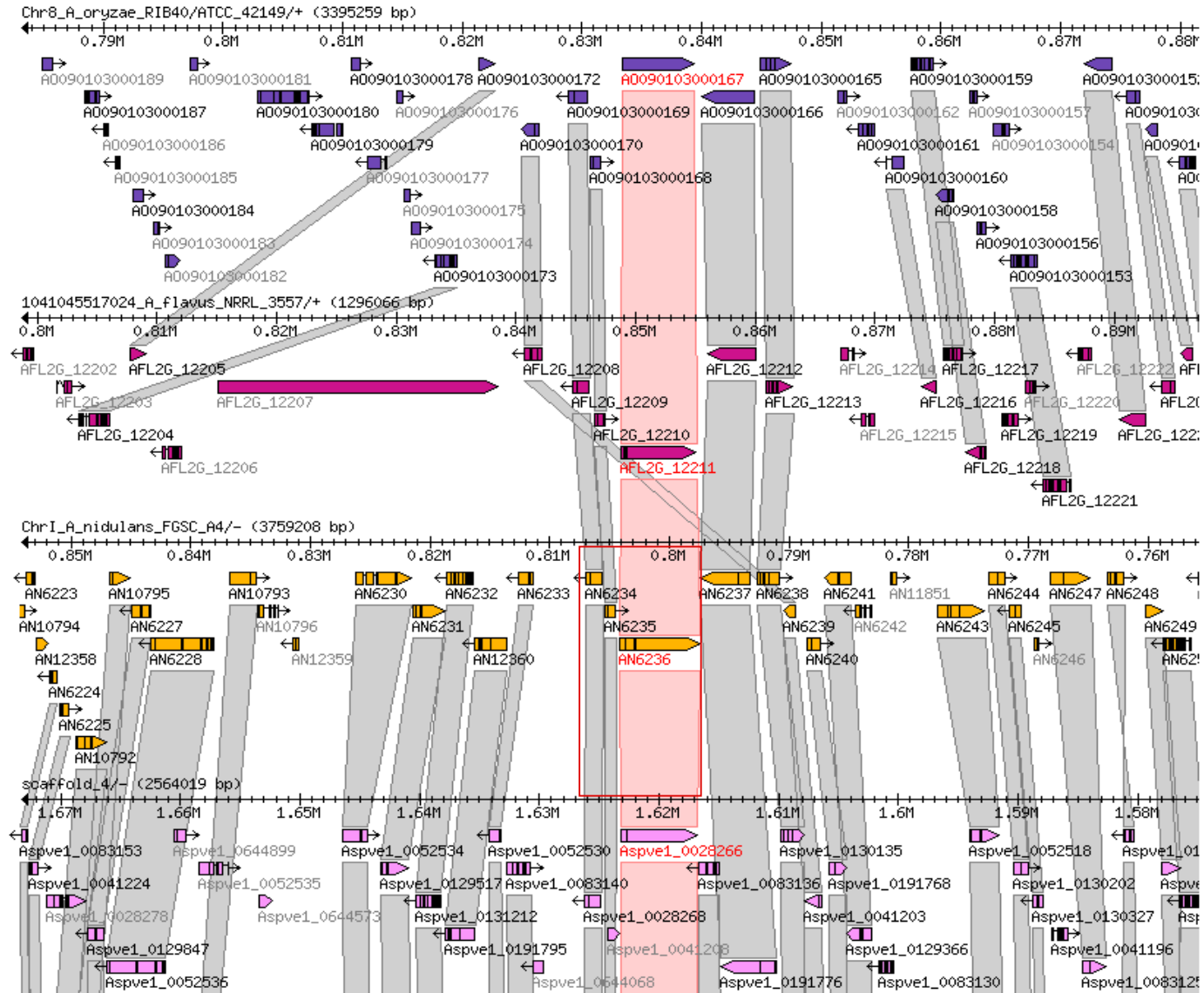
AN5610 cluster



AN5610 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					proteasome activator subunit 4	prot_ID_259	AN5607	
n/a					Protein of unknown function	prot_ID_380	AN9473	ECS, IGD
n/a					Aldo-keto reductase	prot_ID_938	AN9474	
n/a					Protein of unknown function	prot_ID_829	AN5608	
n/a					Zn(II)2Cys6 transcription factor	prot_ID_360	AN5609	
n/a					MFS transporter	prot_ID_44	AN10720	
n/a					L-aminoadipate-semialdehyde dehydrogenase	prot_ID_534	AN5610	FA
n/a				canA	Carbonic anhydrase	prot_ID_58	AN5611	
n/a					Protein of unknown function	prot_ID_629	AN5612	
n/a				hxA	Xanthine dehydrogenase	prot_ID_155	AN5613	
n/a					Pheromone-regulated multispanning membrane protein	prot_ID_727	AN5614	
n/a					Protein of unknown function	prot_ID_257	AN5615	
n/a					Kynurenine aminotransferase	prot_ID_828	AN5616	

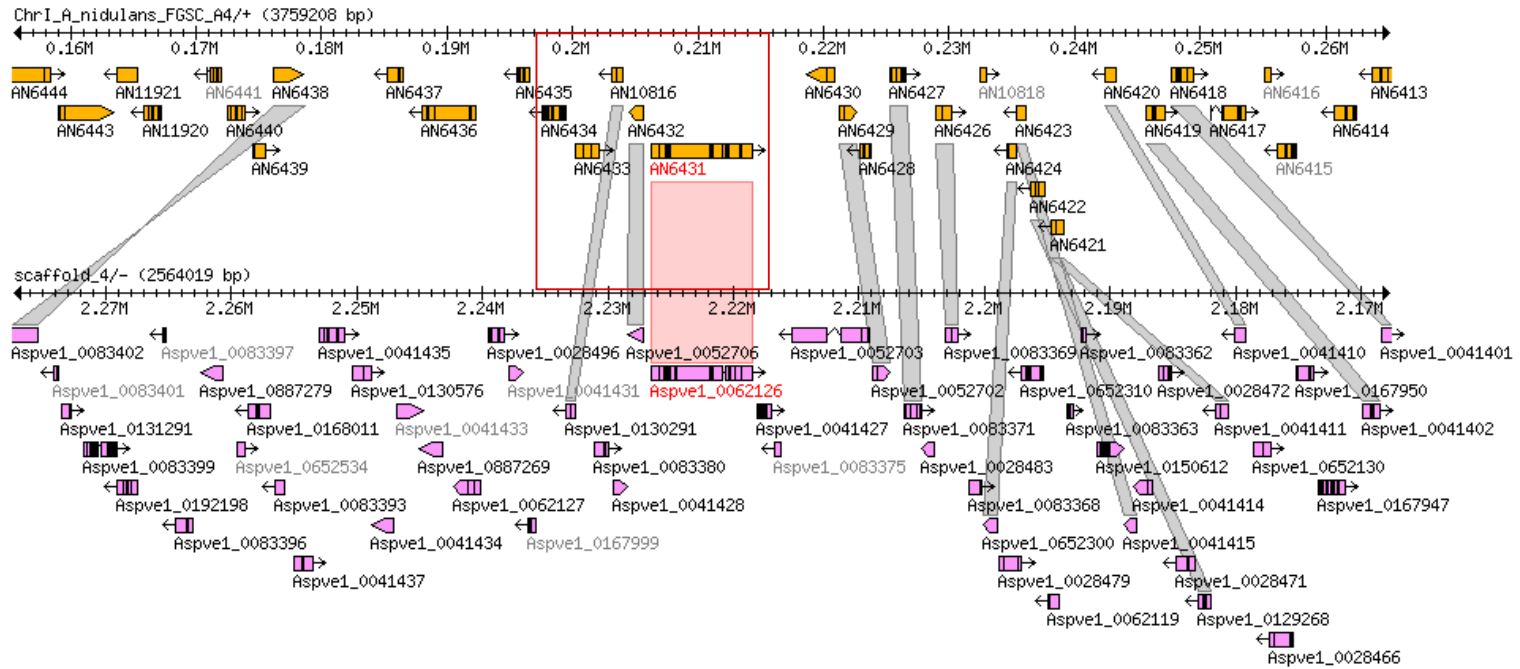
AN6236 cluster



AN6236 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a				medA	medusa, regulator of conidiophore development	prot_ID_378	AN6230	
n/a				trpB	Tryptophan synthase	prot_ID_1061	AN6231	
n/a				vmaB	F1F0-ATPase complex subunit	prot_ID_500	AN6232	
n/a					Protein of unknown function	prot_ID_1266	AN12360	
n/a					DnaJ domain protein	prot_ID_1182	AN6233	
n/a					siderophore biosynthesis acetylase AceI	prot_ID_625	AN6234	ECS, EP
n/a					Enoyl-CoA hydratase/isomerase family protein	prot_ID_60	AN6235	
AN6236.3	0	0	nonribosomal peptide synthetase		Nonribosomal peptide synthetase	prot_ID_745	AN6236	ECS, EP
AN6237.3	-1	353	hypothetical protein conserved hypothetical protein		Transmembrane transporter	prot_ID_178	AN6237	
AN6238.3	-2	358			Transmembrane transporter	prot_ID_866	AN6238	
n/a					Protein of unknown function	prot_ID_293	AN6239	
n/a					Protein of unknown function	prot_ID_496	AN6240	
n/a					Protein of unknown function	prot_ID_1179	AN6241	
n/a					Protein of unknown function	prot_ID_622	AN6242	
n/a					Protein of unknown function	prot_ID_1263	AN11851	

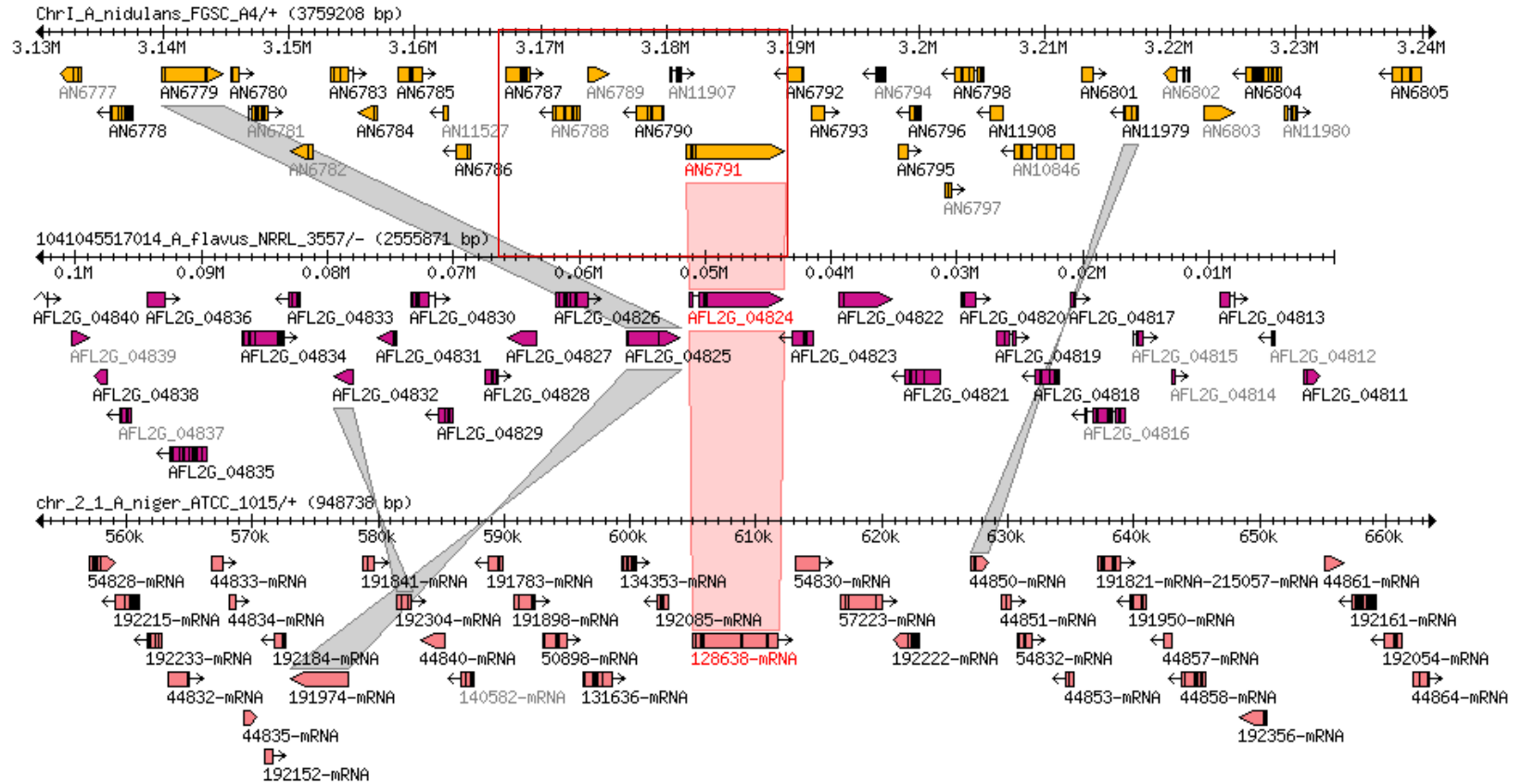
AN6431 cluster



AN6431 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	prot_ID_631	AN10818	
n/a					Protein of unknown function	prot_ID_1011	AN6426	
n/a				manC	Endo-beta-(1,4)-mannanase	prot_ID_449	AN6427	
n/a					Beta-1,4-endoglucanase	prot_ID_1135	AN6428	
AN6429.3	2	331	conserved hypothetical protein		Transmembrane transporter	prot_ID_574	AN6429	
AN6430.3	1	1146	C6 transcription factor		Zn(II)2Cys6 transcription factor	prot_ID_773	AN6430	
AN6431.3	0	0	polyketide synthase		Polyketide synthase	prot_ID_204	AN6431	ECS, EP
			conserved hypothetical protein		Protein of unknown function	prot_ID_894	AN6432	
AN6432.3	-1	581	conserved hypothetical protein		Protein of unknown function	prot_ID_507	AN10816	
AN10816.3	-2	528	hypothetical protein					
AN6433.3	-3	136	conserved hypothetical protein		Predicted transferase	prot_ID_324	AN6433	
AN6434.3	-4	806	conserved hypothetical protein	CYP672A1	Cytochrome P450	prot_ID_1010	AN6434	EP
n/a					Protein of unknown function	prot_ID_448	AN6435	
n/a					Transmembrane transporter	prot_ID_1134	AN6436	
n/a					Protein of unknown function	prot_ID_573	AN6437	

AN6791 cluster

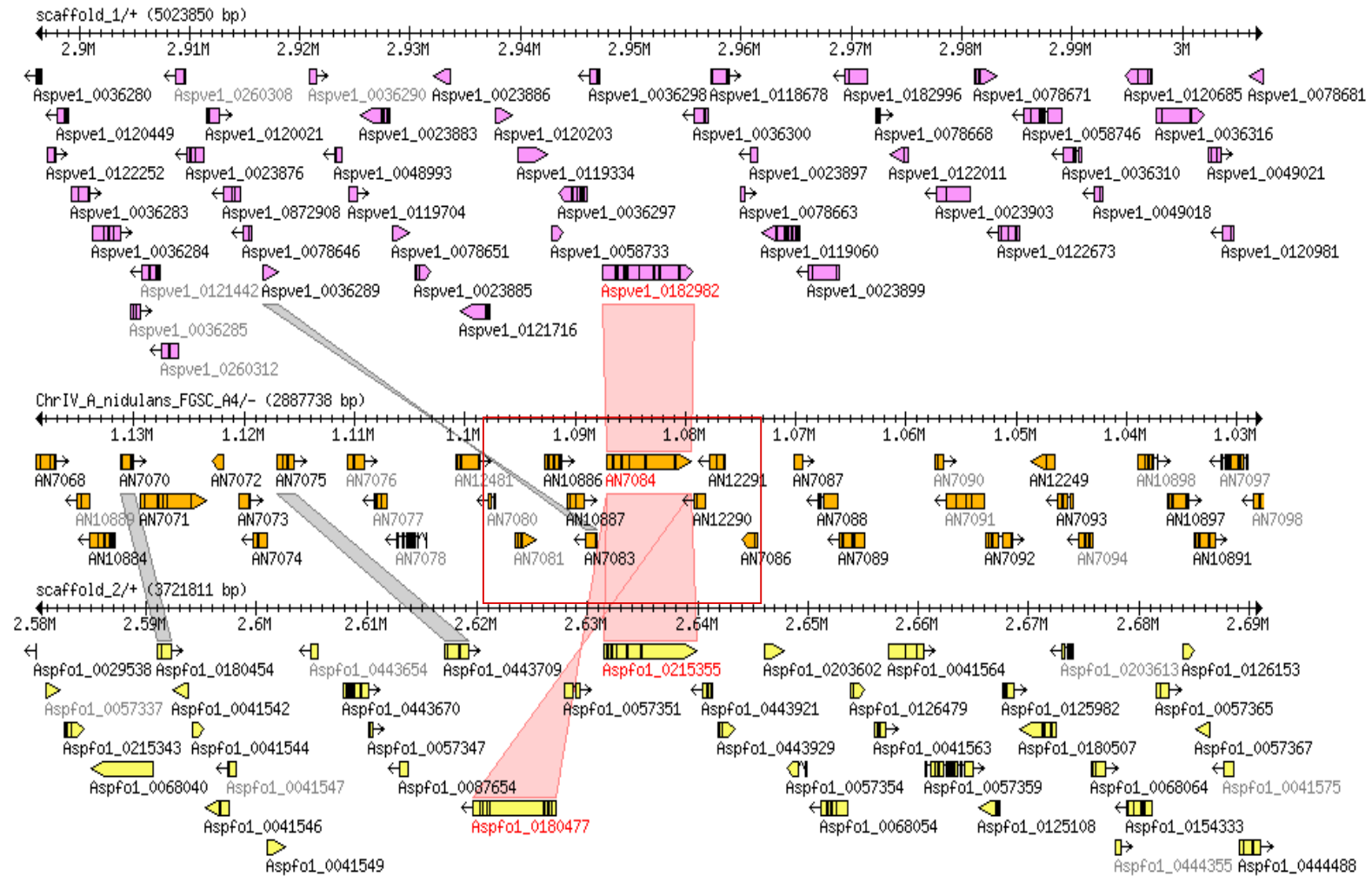


AN6791 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	prot_ID_1002	AN11527	
n/a					Beta-1,4-endoglucanase	prot_ID_1076	AN6786	
n/a				CYP682C1	Cytochrome P450	prot_ID_515	AN6787	IGD
n/a					Zn(II)2Cys6 transcription factor	prot_ID_1196	AN6788	
n/a					Protein of unknown function	prot_ID_638	AN6789	
n/a					Protein of unknown function	prot_ID_838	AN6790	
n/a					Protein of unknown function	prot_ID_1313	AN11907	
n/a					Polyketide synthase	prot_ID_265	AN6791	FA
n/a					NAD+ dependent glycerol 3-phosphate dehydrogenase	prot_ID_953	AN6792	
n/a					Protein of unknown function	prot_ID_390	AN6793	
n/a					Protein of unknown function	prot_ID_1075	AN6794	
n/a					Protein of unknown function	prot_ID_514	AN6795	
n/a					ThiJ/PfpI family protein	prot_ID_1195	AN6796	
n/a					Protein of unknown function	prot_ID_636	AN6797	
n/a					Protein of unknown function	prot_ID_72	AN6798	
n/a					Hydrolase	prot_ID_1323	AN11908	
n/a						prot_ID_864	AN10846	

AN7084 cluster

Overlaps end of pkg cluster

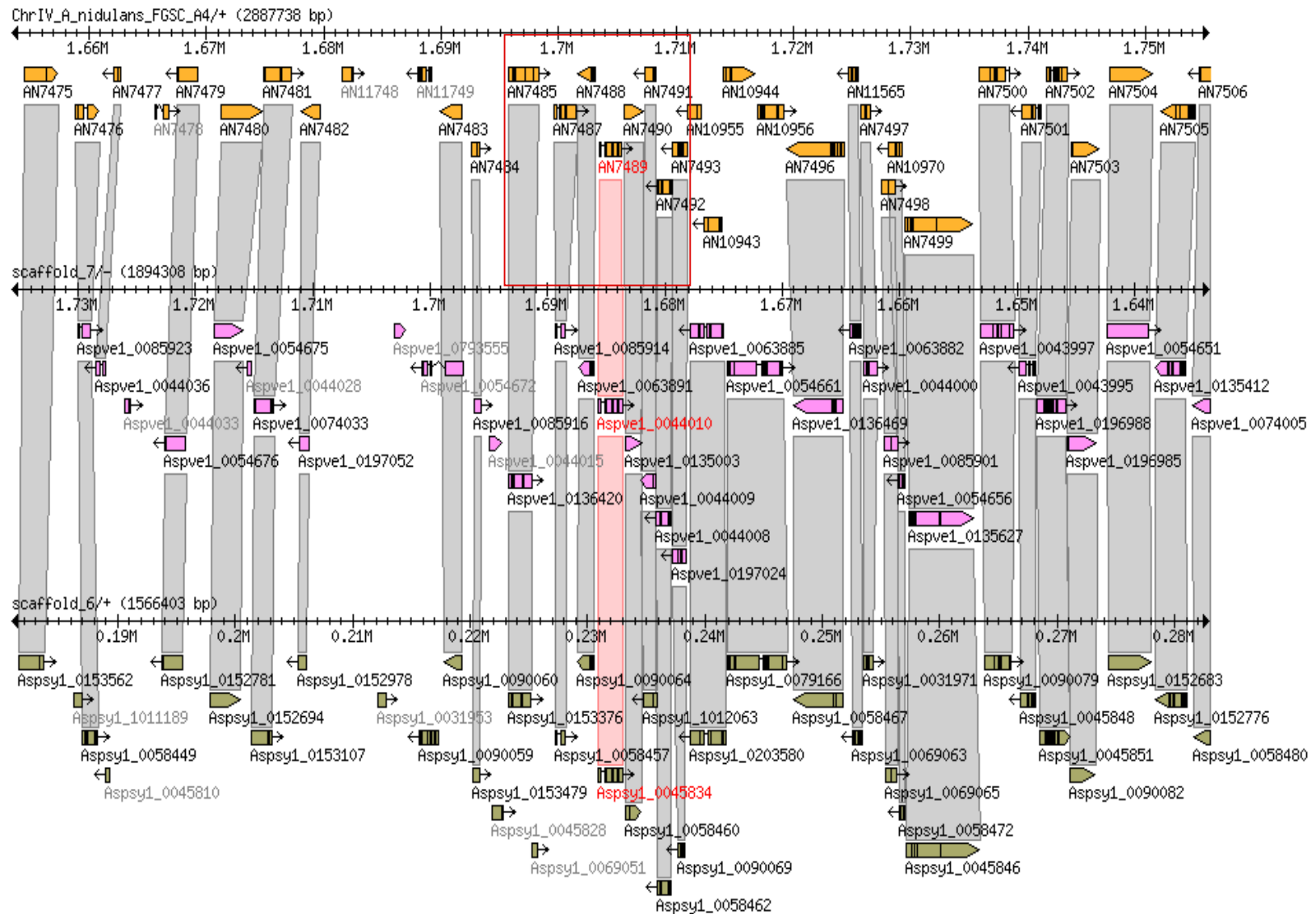


AN7084 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a				acnA	Actinin-like protein	prot_ID_412	AN7077	
n/a					Protein of unknown function	prot_ID_930	AN7078	
n/a					Protein of unknown function	prot_ID_1004	AN12481	
n/a					Protein of unknown function UDP-N-acetylmuramate dehydrogenase	prot_ID_648	AN7080	EP
AN7081.3	4	839	conserved hypothetical protein			prot_ID_229	AN7081	
AN10886.3	3	399	conserved hypothetical protein		Protein of unknown function	prot_ID_59	AN10886	
AN10887.3	2	79	conserved hypothetical protein	CYP5095B1	cytochrome P450	prot_ID_568	AN10887	
AN7083.3	1	612	conserved hypothetical protein		Aminopeptidase polyketide synthase (PKS)-like enzyme	prot_ID_319	AN7083	
AN7084.3	0	0	PKS-like enzyme		Oxidoreductase	prot_ID_836	AN7084	
n/a					Protein of unknown function	prot_ID_977	AN12290	
n/a					Protein of unknown function	prot_ID_999	AN12291	
AN7085.3	-1	239	conserved hypothetical protein		Deleted ORF	n/a		
AN7086.3	-2	1669	conserved hypothetical protein		F-box protein	prot_ID_928	AN7086	EP
AN7087.3	-3	3289	conserved hypothetical protein		Protein of unknown function	prot_ID_502	AN7087	
AN7088.3	-4	1397	conserved hypothetical protein		Transmembrane transporter	prot_ID_81	AN7088	
AN7089.3	-5	146	conserved hypothetical protein		Protein of unknown function	prot_ID_591	AN7089	

AN7489 (mirC) cluster

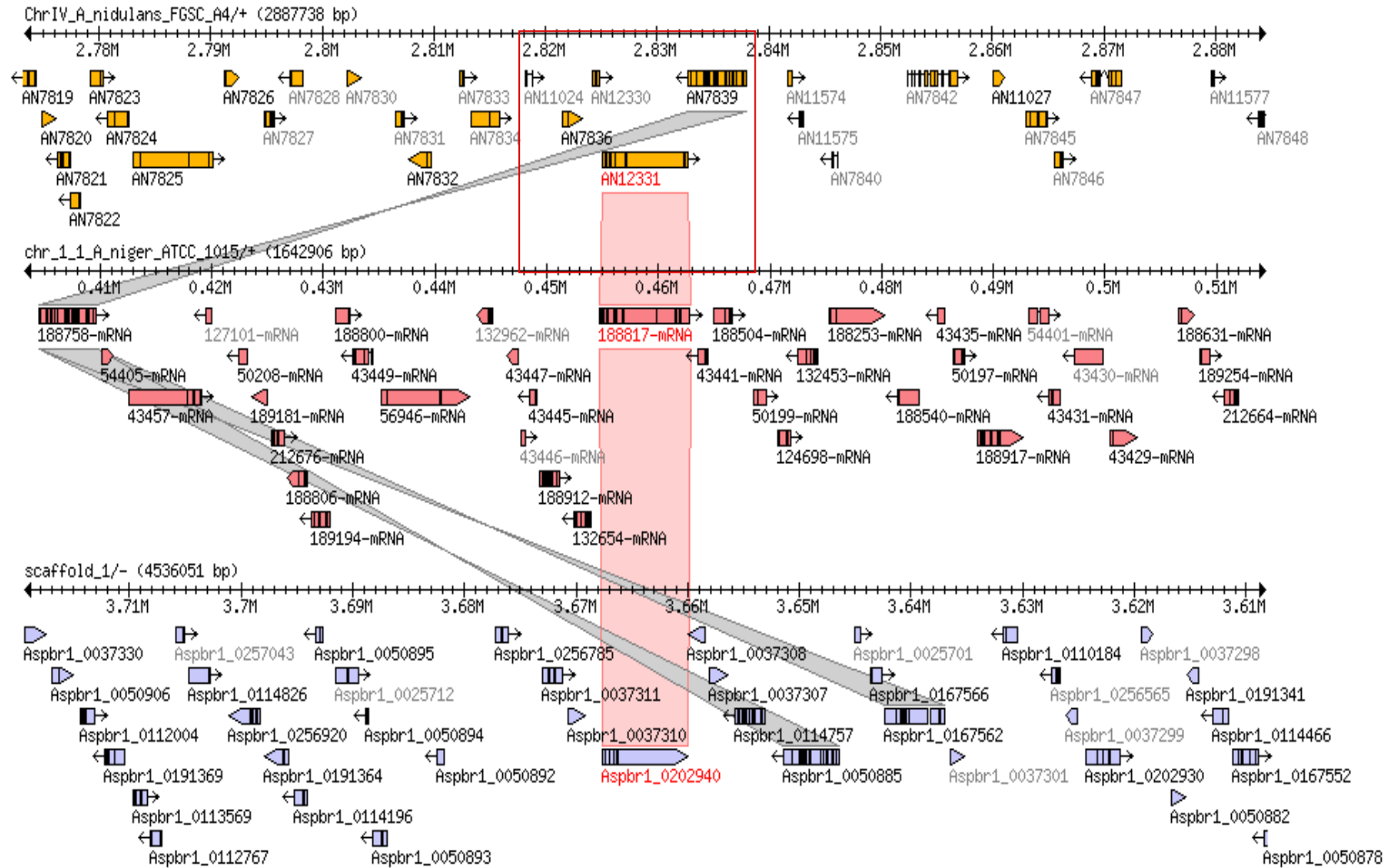
Annotations not typical of secondary metabolite gene clusters



AN7489 (mirC) cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	n/a	AN11749	
n/a					Protein of unknown function	n/a	AN7483	
n/a					DUF1349 domain protein	n/a	AN7484	
AN7485.3	4	103	siderophore iron transporter	mirC	siderophore iron transporter	n/a	AN7485	ECS
AN7486.3	3	595	predicted protein		Deleted by the Broad	n/a	AN7486	
AN7487.3	2	81	hypothetical protein similar to MODA	modA	Rho GTPase	n/a	AN7487	
AN7488.3	1	598	conserved hypothetical protein		agmatinase	n/a	AN7488	
AN7489.3	0	0	mitochondrial 3-oxoacyl-[acyl-carrier-protein]-synthase		mitochondrial 3-oxoacyl-[acyl-carrier-protein]-synthase	n/a	AN7489	
n/a					MT-A70 family protein	n/a	AN7490	
n/a					ubiquitin C-terminal hydrolase	n/a	AN7491	
n/a					mRNA decapping hydrolase	n/a	AN7492	
n/a					Protein of unknown function	n/a	AN7493	ECS

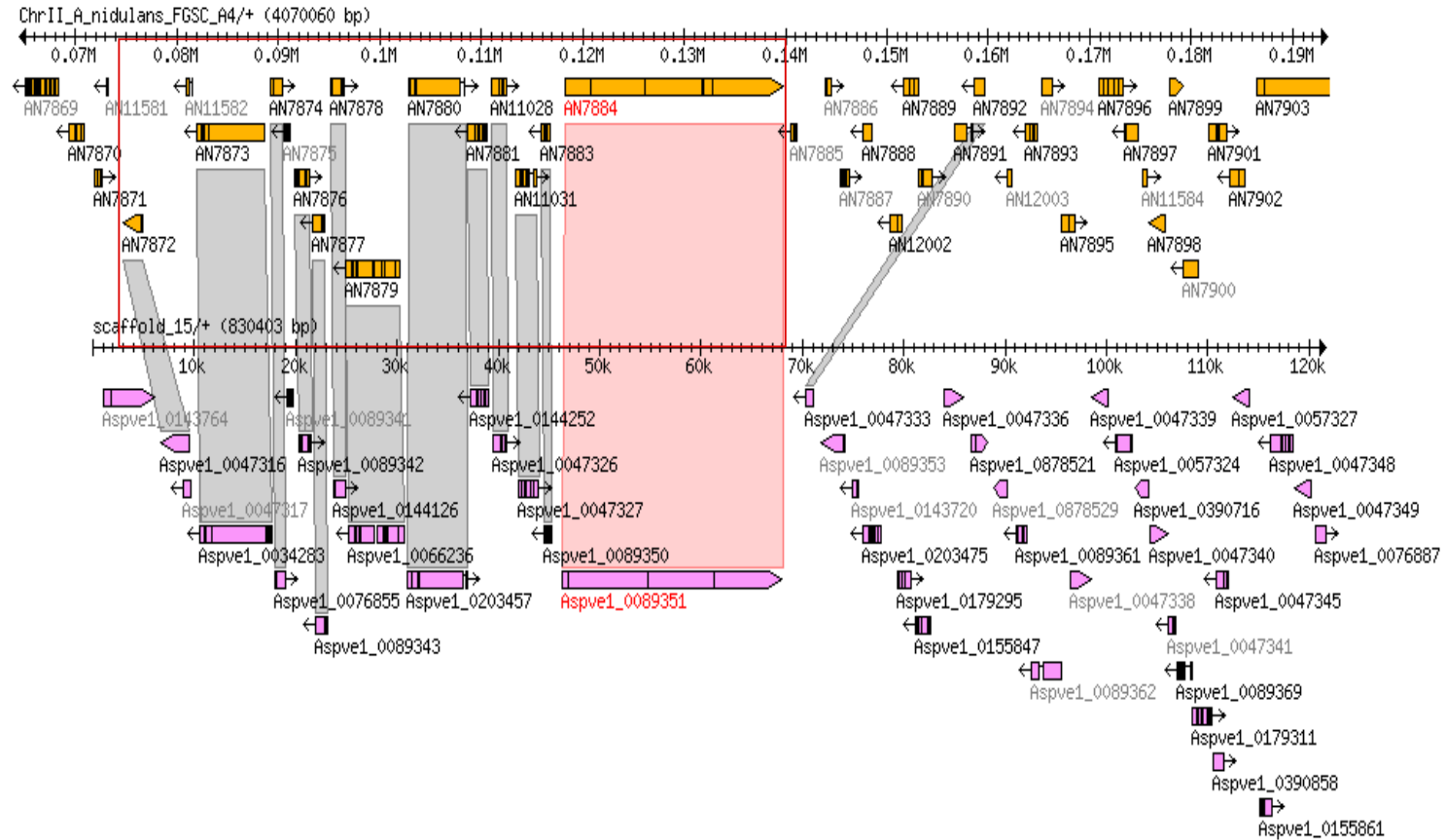
AN7838 (AN12331) cluster



AN7838 (AN12331) cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	n/a	AN7831	
n/a					Oxidoreductase	n/a	AN7832	
n/a					Protein of unknown function	n/a	AN7833	
n/a					Protein of unknown function	n/a	AN7834	
n/a					Oxidoreductase	n/a	AN11024	FA
AN7836.3	2	1176	conserved hypothetical protein		Protein of unknown function	n/a	AN7836	
AN7837.3	1	225	PKS-like enzyme		Deleted ORF	n/a	AN7837	
					Domain(s) with predicted catalytic activity and role in biosynthetic process		AN12330	
					Polyketide synthase (PKS)-like enzyme	n/a	AN12331	
AN7838.3	0	0	PKS-like enzyme		Transmembrane transporter ATPase	n/a	AN7839	FA
AN7839.3	-1	40	conserved hypothetical protein		Protein of unknown function	n/a	AN11574	
n/a					Protein of unknown function	n/a	AN11575	
n/a					Protein of unknown function	n/a	AN7840	

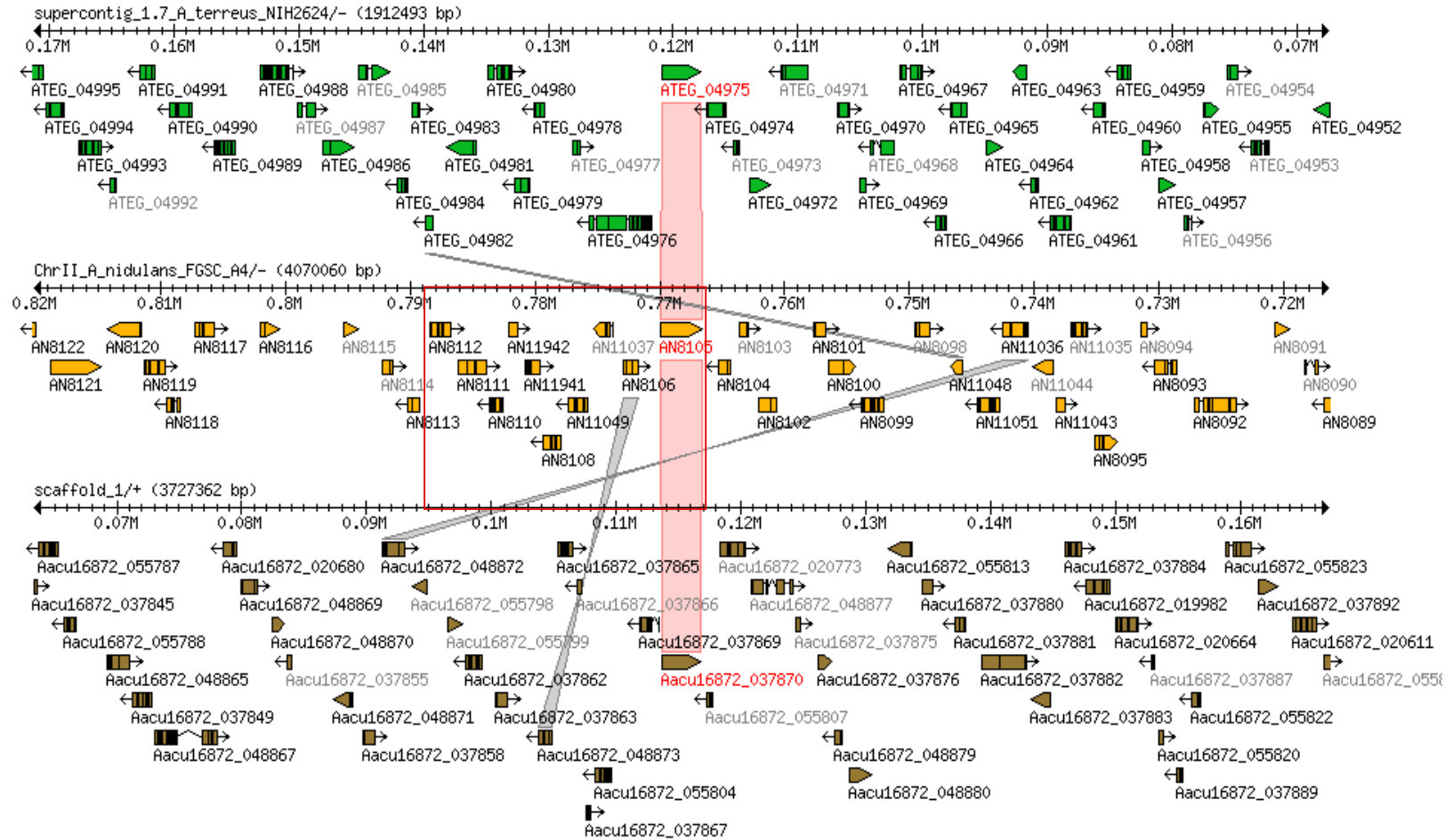
AN7884 cluster



AN7884 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Zn(2)C(6) transcription factor	n/a	AN7872	ECS, EP
n/a					Protein of unknown function	n/a	AN11582	
AN7873.3	12	875	fatty acid synthase beta subunit, putative		Fatty acid synthase beta subunit	n/a	AN7873	
AN7874.3	11	247	conserved hypothetical protein		Protein of unknown function	n/a	AN7874	
AN7875.3	10	625	conserved hypothetical protein		Protein of unknown function	n/a	AN7875	
AN7876.3	9	228	conserved hypothetical protein		Branched chain amino acid aminotransferase	n/a	AN7876	
AN7877.3	8	552	conserved hypothetical protein		RTA1 domain protein	n/a	AN7877	
AN7878.3	7	311	conserved hypothetical protein		Branched chain amino acid aminotransferase	n/a	AN7878	
AN7879.3	6	1102	conserved hypothetical protein		Transmembrane transporter ATPase	prot_ID_1087	AN7879	
AN7880.3	5	99	fatty acid synthase subunit alpha		Fatty-acyl-CoA synthase	prot_ID_1305	AN7880	
AN7881.3	4	662	conserved hypothetical protein	CYP548C1	Cytochrome P450	prot_ID_684	AN7881	
AN11028.3	3	1127	conserved hypothetical protein		Oxidoreductase	prot_ID_743	AN11028	
AN11031.3	2	521	conserved hypothetical protein		Transmembrane transporter	prot_ID_1094	AN11031	
AN7883.3	1	1099	conserved hypothetical protein		Protein of unknown function	prot_ID_811	AN7883	
AN7884.3	0	0	nonribosomal peptide synthase		Nonribosomal peptide synthase	prot_ID_212	AN7884	ECS, EP
n/a					Protein of unknown function	prot_ID_951	AN7885	
n/a					Class V chitinase	prot_ID_339	AN7886	
n/a					Protein of unknown function	prot_ID_1085	AN7887	
n/a					Protein of unknown function	prot_ID_467	AN7888	
n/a					Dioxygenase	prot_ID_1397	AN12002	
n/a					Protein of unknown function	prot_ID_1213	AN7889	
n/a					Glucose oxidase	prot_ID_79	AN7890	
n/a					Beta-1,4-endoglucanase	prot_ID_809	AN7891	
n/a					Small heat-shock protein	prot_ID_209	AN7892	

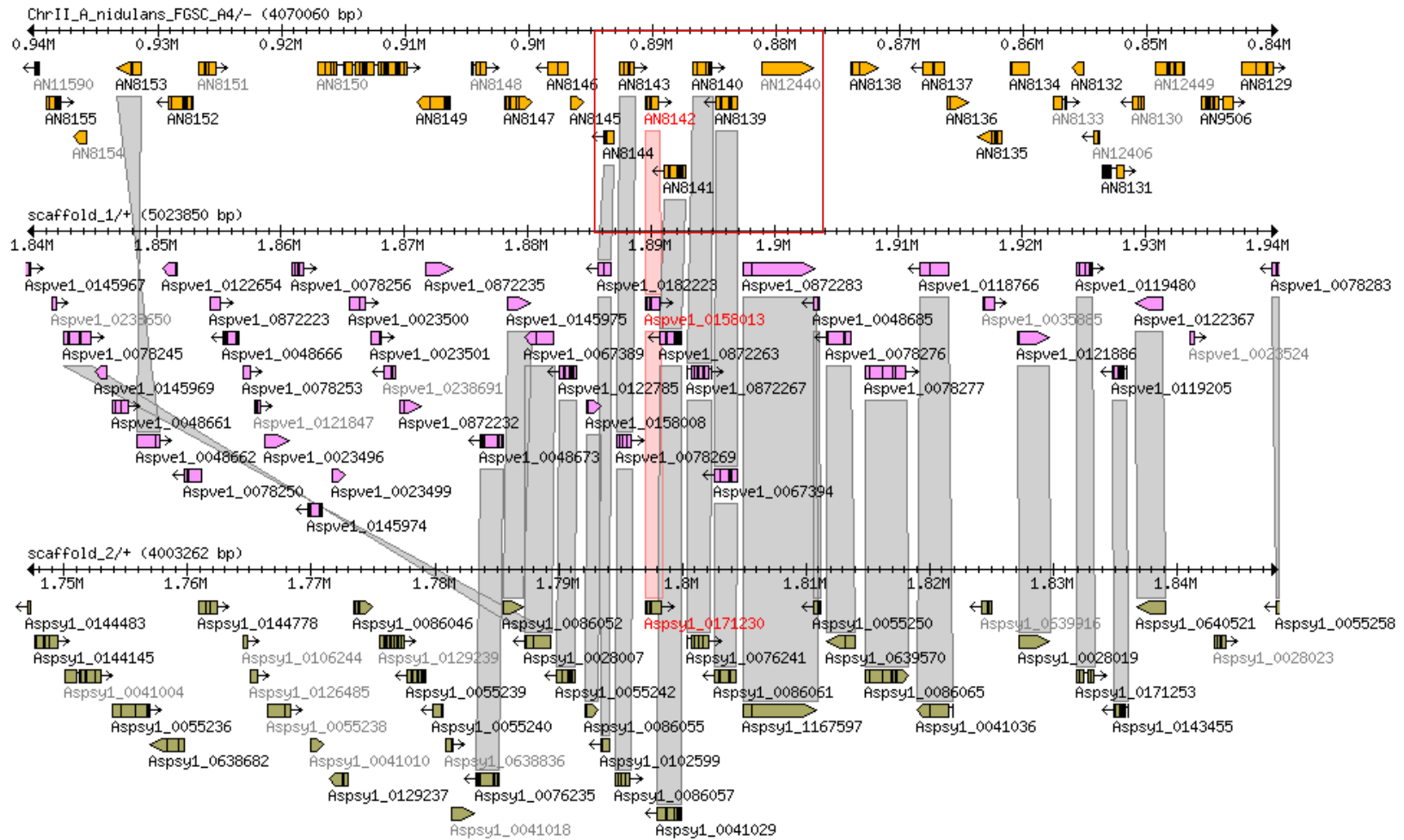
AN8105 cluster



AN8105 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	prot_ID_553	AN8098	
n/a					Oxalate decarboxylase	prot_ID_1302	AN8099	
n/a					Solute:hydrogen antiporter	prot_ID_432	AN8100	
n/a					Transcription factor	prot_ID_1178	AN8101	
n/a					Pepsin-like aspartic protease	prot_ID_563	AN8102	
AN8103.3	2	361	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	prot_ID_1315	AN8103	
AN8104.3	1	1361	conserved hypothetical protein		RTA1 domain protein	prot_ID_696	AN8104	
AN8105.3	0	0	NRPS-like enzyme		NRPS-like enzyme	prot_ID_90	AN8105	ECS, EP
AN8106.3	-1	1967	conserved hypothetical protein		Dioxygenase	prot_ID_823	AN8106	
AN11037.3	-2	1133	conserved hypothetical protein		Transmembrane transporter	prot_ID_134	AN11037	
AN11049.3	-3	329	conserved hypothetical protein		Protein of unknown function	prot_ID_391	AN11049	
AN8108.3	-4	806	conserved hypothetical protein		Fumarylacetoacetase	prot_ID_964	AN8108	
AN8109.3	-5	120	conserved hypothetical protein		Deleted ORF			
n/a					L-iditol 2-dehydrogenase	prot_ID_1373	AN11941	
n/a					Predicted ATPase	prot_ID_1385	AN11942	
AN8110.3	-6	247	conserved hypothetical protein		Oxidoreductase	prot_ID_562	AN8110	
AN8111.3	-7	117	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	prot_ID_1314	AN8111	
AN8112.3	-8	457	conserved hypothetical protein		Transmembrane transporter	prot_ID_695	AN8112	EP
AN8113.3	-9	895	conserved hypothetical protein		Oxidoreductase	prot_ID_89	AN8113	
n/a					Protein of unknown function	n/a	AN8114	
n/a					Protein of unknown function	n/a	AN8115	

AN8142 cluster



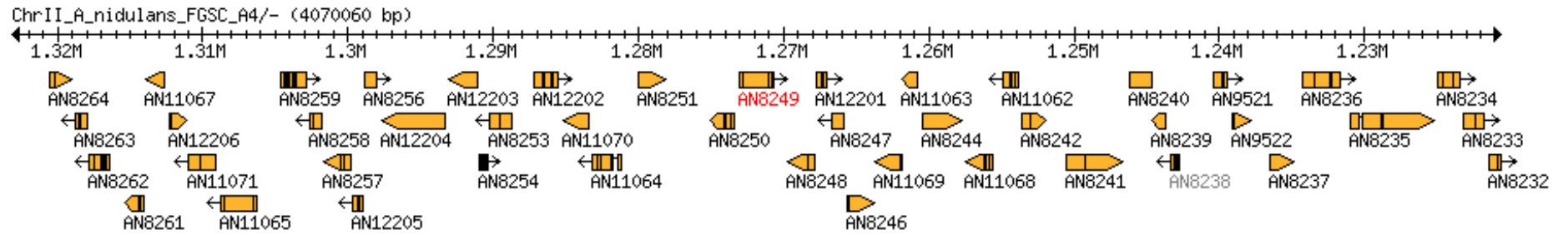
AN8142 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	prot_ID_344	AN8133	
n/a					Acyl transferase	prot_ID_1090	AN8134	
n/a					Hexosyl transferase	prot_ID_471	AN8135	
n/a					Protein of unknown function	prot_ID_1219	AN8136	
n/a					Alcohol O-acetyltransferase	prot_ID_600	AN8137	
n/a				aglC	Alpha-galactosidase, ACP phosphopantetheine attachment site binding, fatty acid biosynthetic process, phosphopantetheine binding, transferase activity	prot_ID_2	AN8138	
n/a						prot_ID_1358	AN12440	FA
n/a				CYP652A1	Cytochrome P450 Monooxygenase	prot_ID_730	AN8139	
n/a						prot_ID_956	AN8140	
n/a				CYP5073A1	Cytochrome P450 UbiA-like prenyltransferase Geranylgeranyl pyrophosphate synthetase AtmG	prot_ID_342	AN8141	
n/a						prot_ID_1089	AN8142	
n/a					Protein of unknown function	prot_ID_470	AN8143	
n/a						prot_ID_1217	AN8144	ECS
n/a					DUF985 domain protein	prot_ID_599	AN8145	
n/a					Protein of unknown function	prot_ID_1350	AN8146	
n/a					Protein of unknown function	prot_ID_729	AN8147	

AN8209 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	n/a	AN11597	
n/a					Protein of unknown function	n/a	AN8200	
n/a					DNA helicase	n/a	AN8201	
n/a					Protein of unknown function	prot_ID_781	AN8202	
n/a					NAD+ synthase	prot_ID_174	AN8203	
n/a					NAD+ diphosphatase	prot_ID_915	AN8204	
n/a					Protein of unknown function	prot_ID_302	AN8205	
n/a					Protein of unknown function	prot_ID_1050	AN8206	
n/a					Protein of unknown function	prot_ID_430	AN8207	
n/a					Protein of unknown function	prot_ID_1177	AN8208	
n/a				wA	Polyketide synthase, dark green pigment formation	prot_ID_560	AN8209	ECS, EP
n/a					Deleted; gene split to form AN12403 and AN12404	n/a		
n/a					Protein of unknown function	prot_ID_1360	AN12403	
n/a					Protein of unknown function	prot_ID_1437	AN12404	EP
n/a					Histone demethylase	prot_ID_172	AN8211	
n/a					GIY-YIG catalytic domain containing protein	prot_ID_914	AN8212	
n/a					dTMP kinase	prot_ID_301	AN8213	
n/a					tRNA-guanine transglycosylase family protein	prot_ID_1048	AN8214	

AN8249 cluster

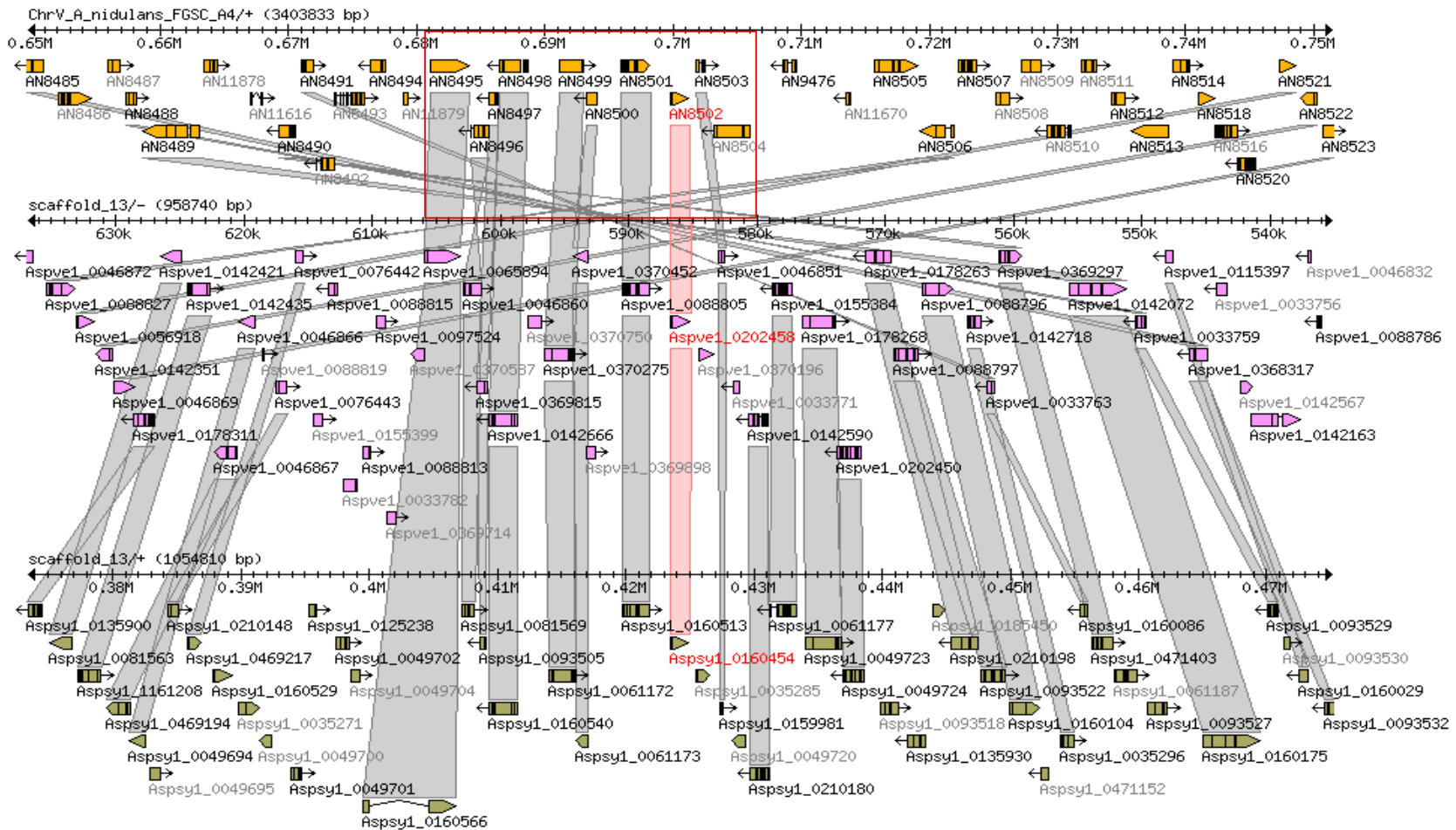


AN8249 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID
n/a					Class III chitinase	prot_ID_259	AN11063
n/a				srpA	Signal recognition particle protein	prot_ID_208	AN8246
n/a					DUF1665 domain protein	prot_ID_950	AN8247
n/a					Oxidoreductase	prot_ID_1402	AN12201
n/a					Mitochondrial fusion protein 2,3-oxidosqualene-lanosterol cyclase	prot_ID_336	AN8248
n/a						prot_ID_1083	AN8249
n/a				CYP647A1	Cytochrome P450	prot_ID_1299	AN8250
n/a				hapX	bZIP transcription factor	prot_ID_682	AN8251
n/a				agnD	Alpha-1,3-glucanase	prot_ID_1008	AN11064
n/a					Protein of unknown function	prot_ID_653	AN11069

AN504 cluster

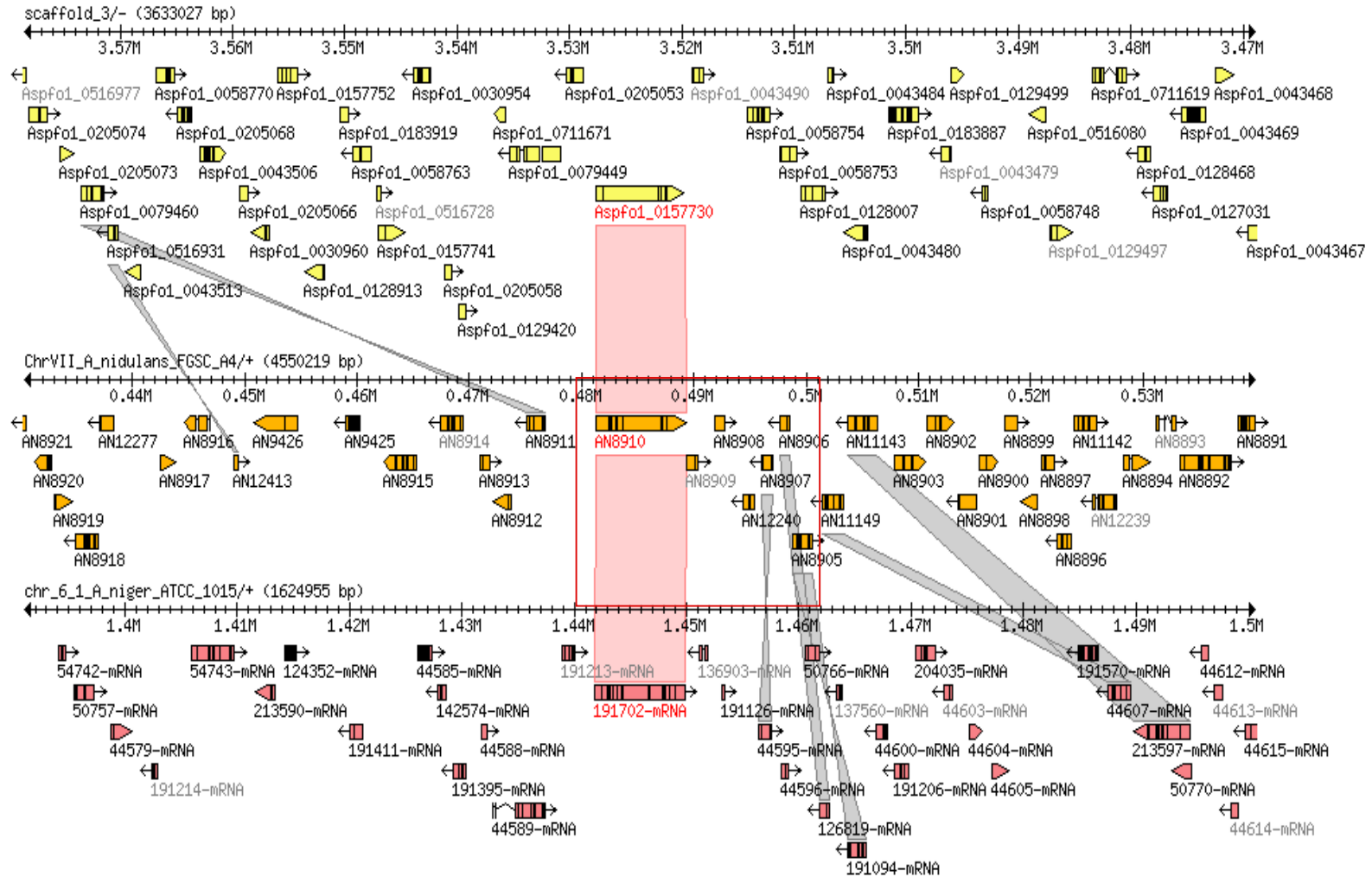
No orthologs for AN504, used AN502 to generate cluster image



AN8504 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					DUF1212 domain membrane protein	prot_ID_432	AN8495	ECS
n/a					Class II aldolase/adducin domain protein	prot_ID_990	AN8496	
n/a					Carbon-sulfur lyase	prot_ID_532	AN8497	
n/a					Proteinase	prot_ID_56	AN8498	
n/a					Siderochrome-iron transporter	prot_ID_628	AN8499	
n/a					Protein of unknown function	prot_ID_1002	AN8500	
n/a					Protein of unknown function	prot_ID_545	AN8501	
n/a					Transmembrane transporter	prot_ID_70	AN8502	
n/a					Protein of unknown function	prot_ID_642	AN8503	
n/a					Nonribosomal peptide synthase	prot_ID_167	AN8504	FA
n/a					Protein of unknown function	prot_ID_2	AN9476	
n/a					Protein of unknown function	prot_ID_630	AN11670	
n/a					Protein of unknown function	prot_ID_738	AN8505	
n/a					Zn(II)2Cys6 transcription factor	prot_ID_271	AN8506	
n/a					Transmembrane transporter	prot_ID_838	AN8507	
n/a					Protein of unknown function	prot_ID_374	AN8508	

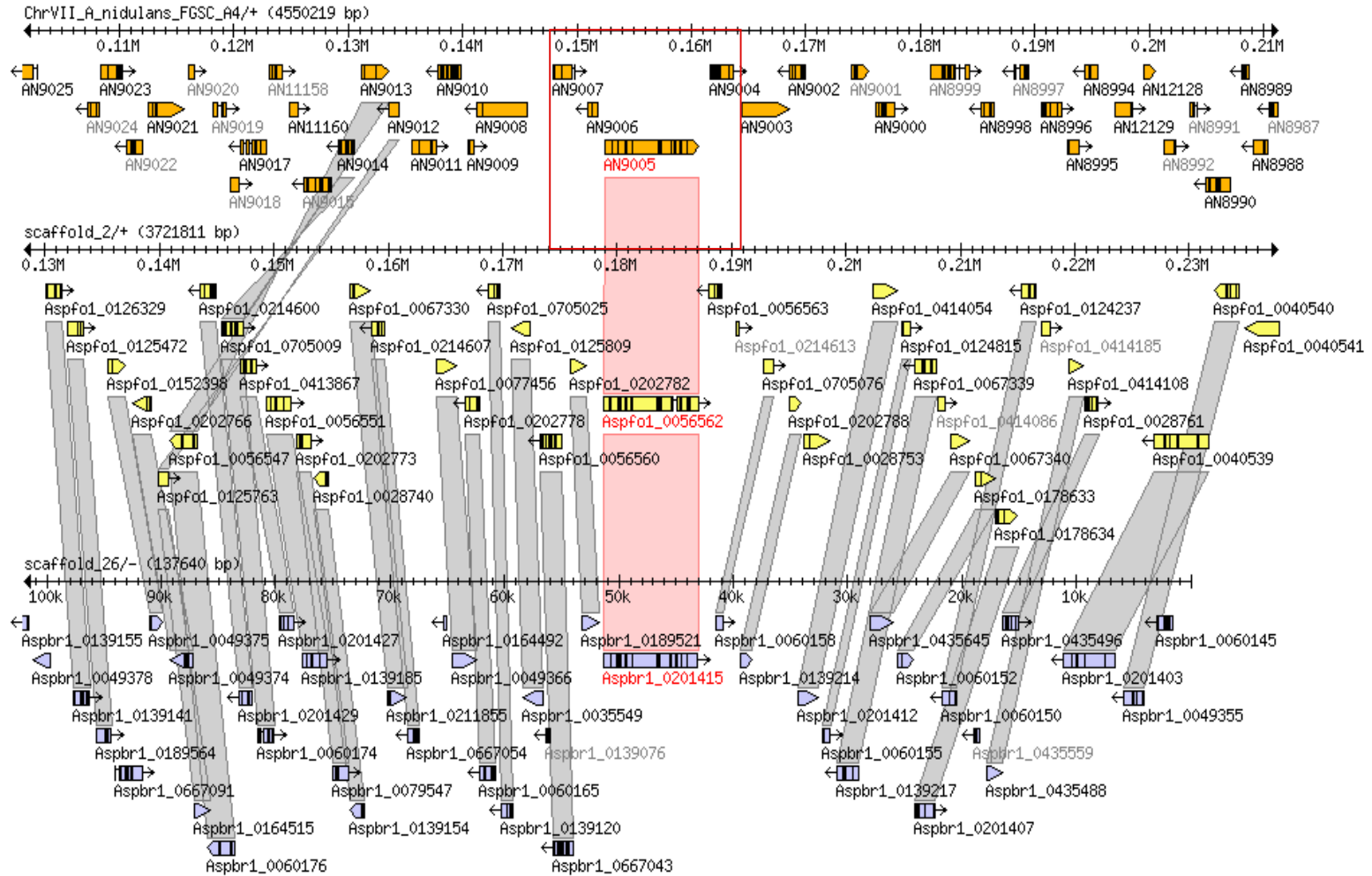
AN8910 cluster



AN8910 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
AN8901.3	10	316	conserved hypothetical protein			n/a		
AN8902.3	9	428	conserved hypothetical protein			n/a		
AN8903.3	8	2432	conserved hypothetical protein		Peptide transporter	prot_ID_353	AN8903	
AN11143.3	7	363	conserved hypothetical protein	glaA	Glucoamylase	prot_ID_246	AN11143	
AN11149.3	6	868	conserved hypothetical protein		Arylsulfatase	prot_ID_679	AN11149	
AN8905.3	5	285	conserved hypothetical protein		Cytochrome P450	prot_ID_497	AN8905	ECS
AN8906.3	4	502	conserved hypothetical protein		Protein of unknown function	prot_ID_1313	AN8906	
AN8907.3	3	3264	conserved hypothetical protein		C-4 sterol methyl oxidase	prot_ID_640	AN8907	
n/a					Protein of unknown function	prot_ID_1507	AN12240	
AN8908.3	2	1360	conserved hypothetical protein		Protein of unknown function	prot_ID_1455	AN8908	
AN8909.3	1	338	conserved hypothetical protein		Protein of unknown function	prot_ID_788	AN8909	
AN8910.3	0	0	polyketide synthase		polyketide synthase	prot_ID_1021	AN8910	ECS
n/a					Transmembrane transporter	prot_ID_350	AN8911	
n/a					Myo-inositol transporter	prot_ID_1164	AN8912	
n/a					Glycosylphosphatidylinositol (GPI)-anchored protein	prot_ID_494	AN8913	
n/a					Protein of unknown function	prot_ID_1310	AN8914	
n/a					Transmembrane transporter	prot_ID_637	AN8915	

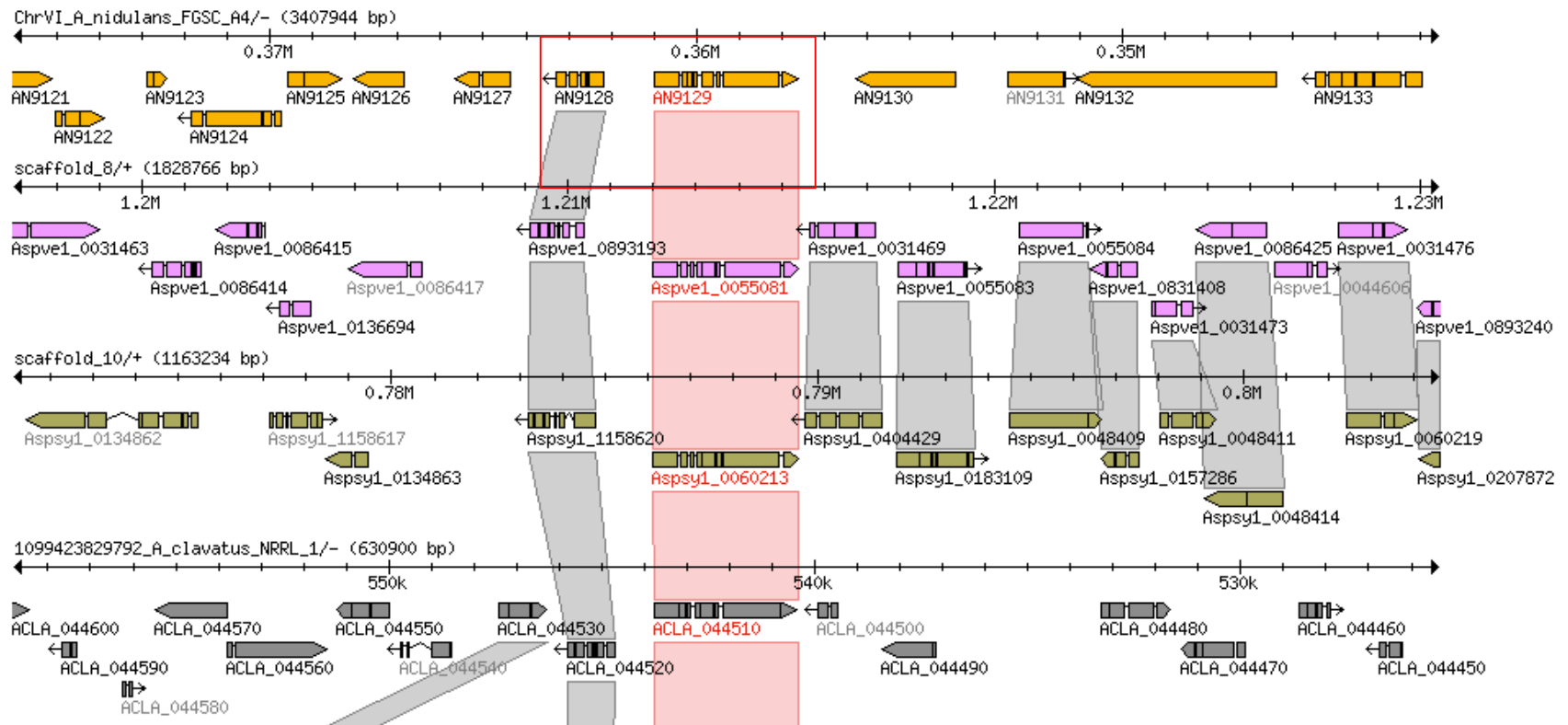
AN9005 cluster



AN9005 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Transmembrane transporter	prot_ID_591	AN9000	
n/a					Protein of unknown function	prot_ID_1408	AN9001	
AN9002.3	3	10	conserved hypothetical protein		Oxidoreductase	prot_ID_737	AN9002	
AN9003.3	2	737	conserved hypothetical protein		Aspartic-type endopeptidase	prot_ID_67	AN9003	
AN9004.3	1	1173	conserved hypothetical protein		Monoxygenase	prot_ID_883	AN9004	EP
AN9005.3	0	0	polyketide synthase		Polyketide synthase	prot_ID_208	AN9005	
AN9006.3	-1	739	conserved hypothetical protein		Protein of unknown function	prot_ID_1028	AN9006	
AN9007.3	-2	1425	conserved hypothetical protein	CYP548D1	Cytochrome P450	prot_ID_358	AN9007	EP
AN9008.3	-3	2562	hypothetical protein similar to phytochrome	fphA	Phytochrome photoreceptor	prot_ID_1170	AN9008	
AN9009.3	-4	67	conserved hypothetical protein		Protein of unknown function	prot_ID_503	AN9009	
AN9010.3	-5	665	hypothetical protein		Nicotinamide mononucleotide transmembrane transporter	prot_ID_736	AN9010	
AN9011.3	-6	125	conserved hypothetical protein		Aryl-alcohol oxidase-related protein	prot_ID_66	AN9011	
AN9012.3	-7	1297	conserved hypothetical protein		Lyase	prot_ID_881	AN9012	
AN9013.3	-8	175	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	prot_ID_206	AN9013	

AN9129 Cluster

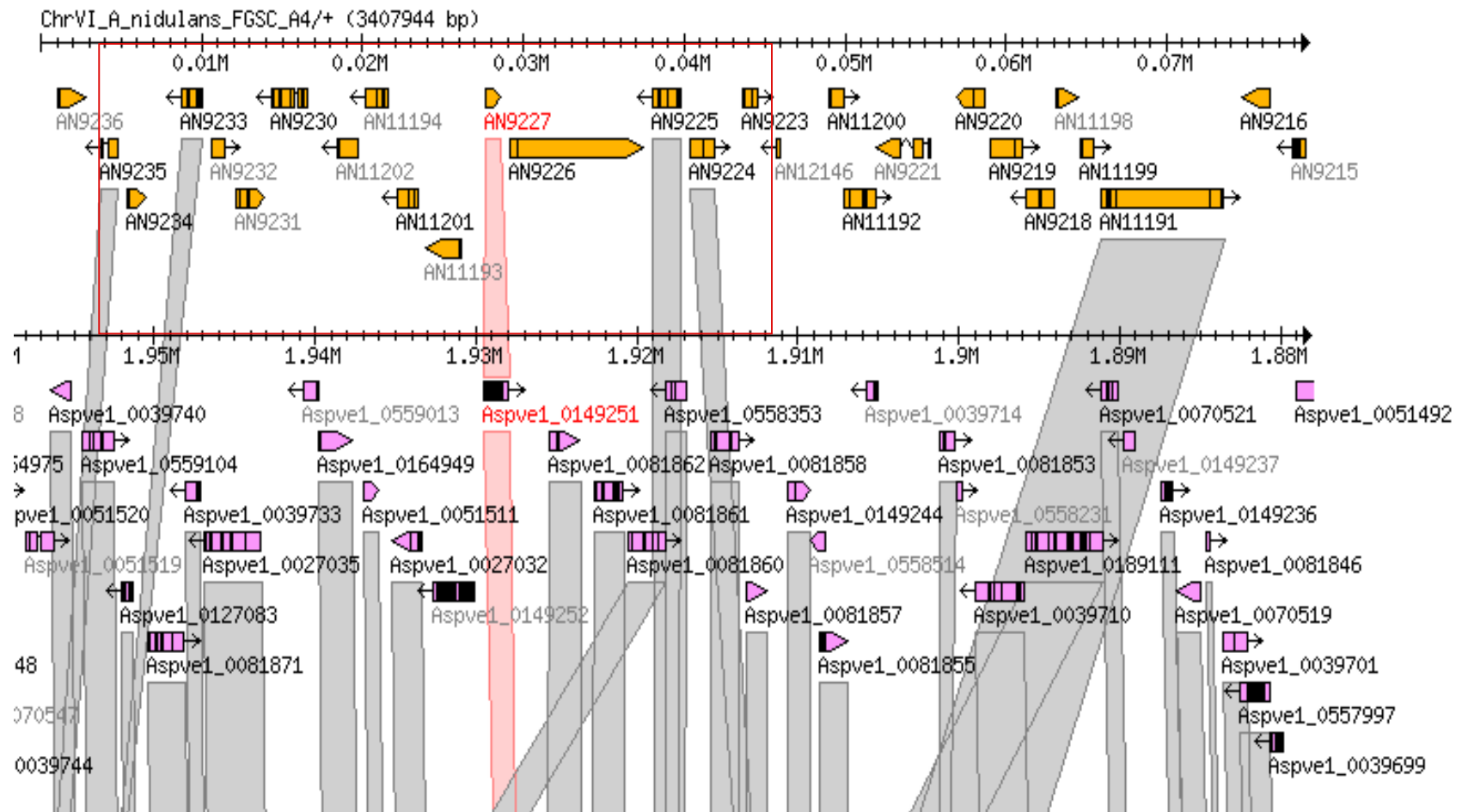


AN9129 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					NRPS-like enzyme enoyl-CoA hydratase/isomerase family protein	n/a	AN9129	ECS, EP
n/a						n/a	AN9130	ECS

AN9226 cluster

Possible overlapping clusters, AN9226 lacks orthologs so AN9227 was used to generate cluster image

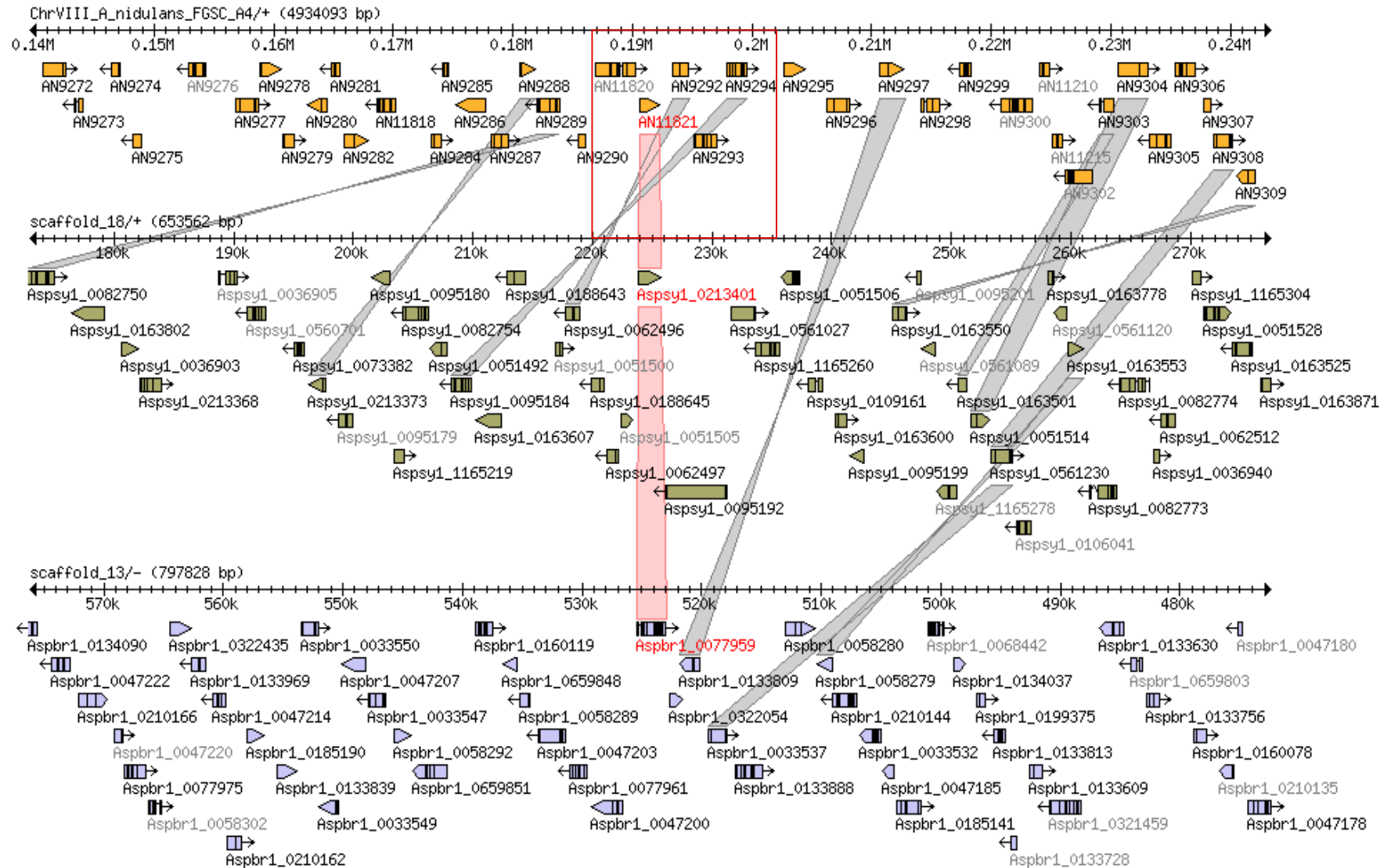


AN9226 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	n/a	AN9215	
n/a					Protein of unknown function	n/a	AN9216	
n/a					polyketide synthase	n/a	AN11191	
n/a					Dihydrofolate reductase	n/a	AN11199	
n/a					Oxidoreductase	n/a	AN11198	
n/a					Sterol 14-demethylase	n/a	AN9218	
n/a					Transmembrane transporter	n/a	AN9219	
n/a					Protein of unknown function	prot_ID_1014	AN9220	
n/a					Zn(II)2Cys6 transcription factor	prot_ID_511	AN9221	
n/a				CYP664A1	Cytochrome P450	prot_ID_108	AN11192	
n/a					Protein of unknown function	prot_ID_329	AN11200	
n/a					Protein of unknown function	prot_ID_1129	AN12146	
AN9223.3	3	1736	conserved hypothetical protein		Demethylsterigmatocystin 6-O-methyltransferase	prot_ID_620	AN9223	EP
AN9224.3	2	633	conserved hypothetical protein		Monooxygenase	prot_ID_133	AN9224	
AN9225.3	1	563	conserved hypothetical protein	CYP679A1	Cytochrome P450	prot_ID_726	AN9225	
AN9226.3	0	0	nonribosomal peptide synthase		Nonribosomal peptide synthase	prot_ID_231	AN9226	
AN9227.3	-1	1045	conserved hypothetical protein		Dioxygenase Domain(s) with predicted oxygen transporter activity and role in transport	prot_ID_832	AN9227	
AN11193.3	-2	616	conserved hypothetical protein			prot_ID_698	AN11193	
AN11201.3	-3	429	conserved hypothetical protein		Oxidoreductase	prot_ID_933	AN11201	
AN11194.3	-4	611	DMATS type aromatic prenyltransferase		DMATS-type aromatic prenyltransferase	prot_ID_210	AN11194	
AN11202.3	-5	363	DMATS type aromatic prenyltransferase		DMATS-type aromatic prenyltransferase	prot_ID_438	AN11202	
AN9230.3	-6	1866	conserved hypothetical protein		Monooxygenase	prot_ID_18	AN9230	
AN9231.3	-7	208	conserved hypothetical protein		UDP-N-acetylmuramate dehydrogenase	prot_ID_617	AN9231	
AN9232.3	-8	666	conserved hypothetical protein		Oxidoreductase	prot_ID_129	AN9232	

AN9233.3	-9	406	conserved hypothetical protein	O-methyltransferase	prot_ID_724	AN9233	
AN9234.3	-10	2320	conserved hypothetical protein	Oxidoreductase	prot_ID_227	AN9234	EP
AN9235.3	-11	638	conserved hypothetical protein	Isochorismatase family hydrolase	prot_ID_830	AN9235	
AN9236.3	-12	895	conserved hypothetical protein	Zn(II)2Cys6 transcription factor	prot_ID_336	AN9236	

AN9291 (AN11820) cluster

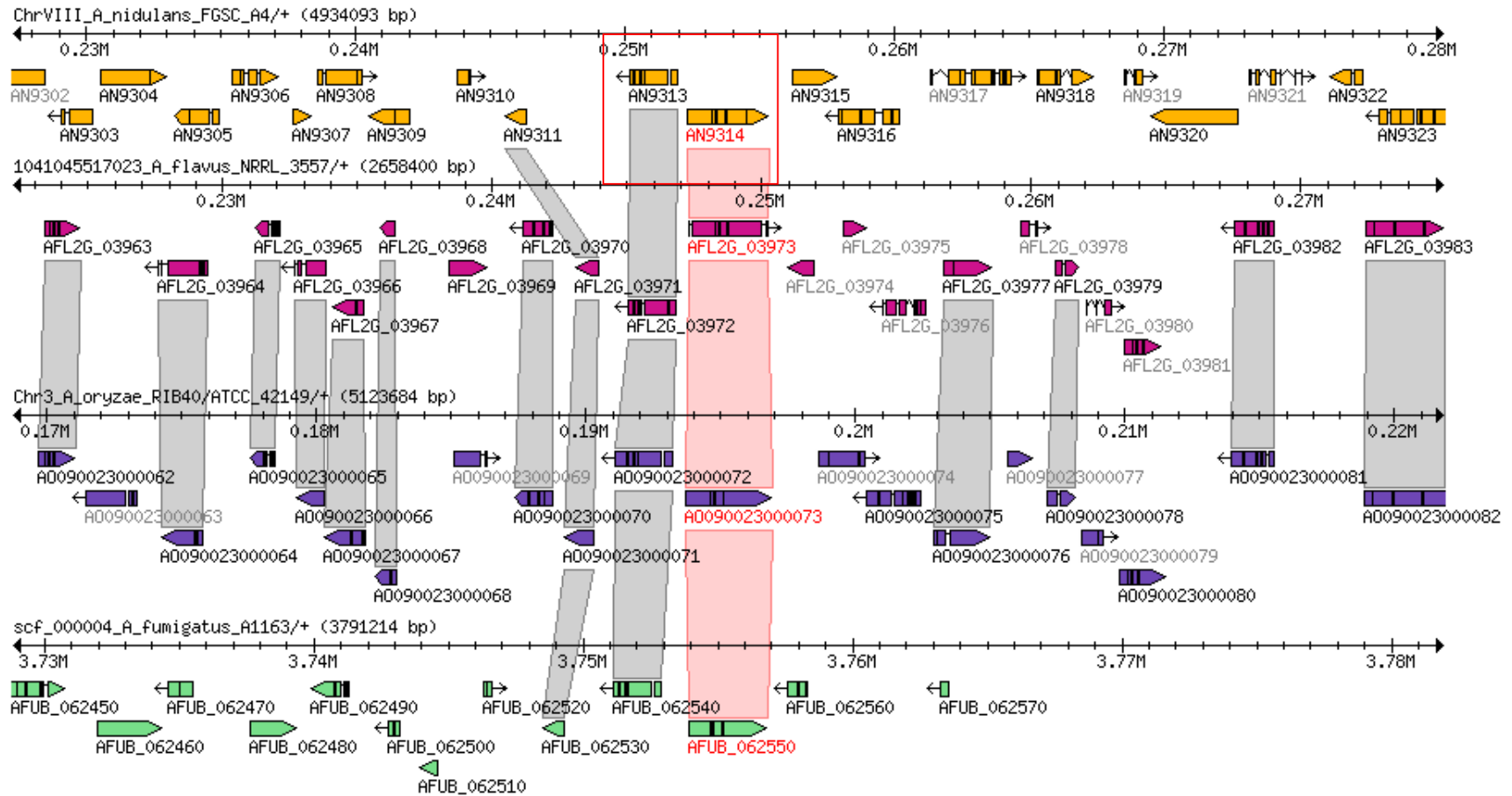


AN9291 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID
AN9280.3	11	354	conserved hypothetical protein		Transmembrane transporter	n/a	AN9280
AN9281.3	10	364	conserved hypothetical protein		Protein of unknown function	n/a	AN9281
AN9282.3	9	738	conserved hypothetical protein		N,N-dimethylaniline monooxygenase	n/a	AN9282
AN9283.3	8	320	conserved hypothetical protein		Possible pseudogene	n/a	AN9283
AN9284.3	7	130	conserved hypothetical protein		Oxidoreductase	n/a	AN9284
AN9285.3	6	577	conserved hypothetical protein		Glucose repressible protein ortholog Grg1	n/a	AN9285
AN9286.3	5	433	conserved hypothetical protein		Alpha-glucuronidase	n/a	AN9286
AN9287.3	4	949	conserved hypothetical protein		Extracellular GDSL-like lipase/acylhydrolase	n/a	AN9287
AN9288.3	3	137	conserved hypothetical protein		Protein of unknown function	n/a	AN9288
AN9289.3	2	1689	conserved hypothetical protein		Transmembrane transporter	n/a	AN9289
AN9290.3	1	855	conserved hypothetical protein		Protein of unknown function	n/a	AN9290
AN9291.3	0	0	MFS transporter/NRPS-like enzyme		Deleted ORF, see AN11820	n/a	AN9291
					Nonribosomal peptide sythetase (NRPS)-like enzyme	n/a	AN11820 EP
					Transmembrane transporter	n/a	AN11821
AN9292.3	-1	1168	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	n/a	AN9292
AN9293.3	-2	435	conserved hypothetical protein		Zn(II)2Cys6 transcription factor	n/a	AN9293
AN9294.3	-3	830	hypothetical protein		Domain(s) with predicted role in transmembrane transport	n/a	AN9294 ECS
AN9295.3	-4	2999	conserved hypothetical protein		Domain(s) with predicted role in transmembrane transport	n/a	AN9295
AN9296.3	-5	1950	conserved hypothetical protein	CYP535D1	Cytochrome P450	n/a	AN9296
AN9297.3	-6	2446	conserved hypothetical protein		Protein of unknown function	n/a	AN9297
AN9298.3	-7	1797	conserved hypothetical protein	gmtB	GDP-mannose transporter	n/a	AN9298

			protein			
AN9299.3	-8	1891	conserved hypothetical protein	Protein of unknown function	n/a	AN9299
AN9300.3	-9	2743	conserved hypothetical protein	Amino acid transmembrane transporter	n/a	AN9300
AN11210.3	-10	953	conserved hypothetical protein	Protein of unknown function	n/a	AN11210
AN11215.3	-11	613	conserved hypothetical protein	Domain(s) with predicted metal ion transmembrane transporter activity	n/a	AN11215
AN9302.3	-12	87	conserved hypothetical protein	Protein serine/threonine kinase	n/a	AN9302
AN9303.3	-13	637	conserved hypothetical protein	Protein of unknown function	n/a	AN9303
AN9304.3	-14	2063	conserved hypothetical protein	Glutathione S-transferase	n/a	AN9304
AN9305.3	-15	214	conserved hypothetical protein	Acyl transferase	n/a	AN9305
AN9306.3	-16	654	hypothetical protein	Protein of unknown function	n/a	AN9306
AN9307.3	-17	427	conserved hypothetical protein	Protein of unknown function	n/a	AN9307

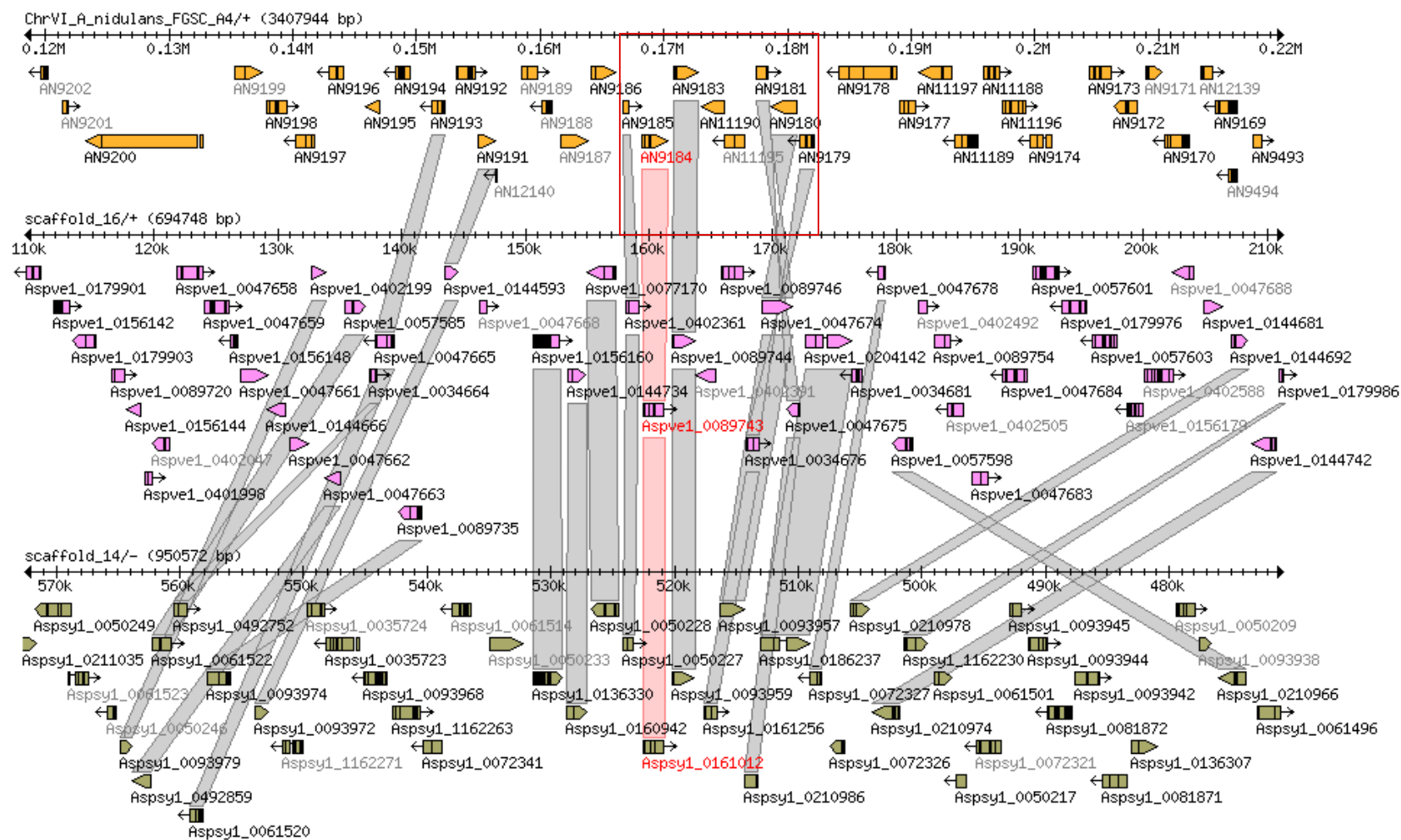
AN9314 cluster



AN9314 cluster

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	n/a	AN9311	
n/a				<i>CYP58D1</i>	Cytochrome P450	n/a	AN9313	EP
n/a					Entkaurene synthase	n/a	AN9314	EP

No PKS/NRPS backbone 1

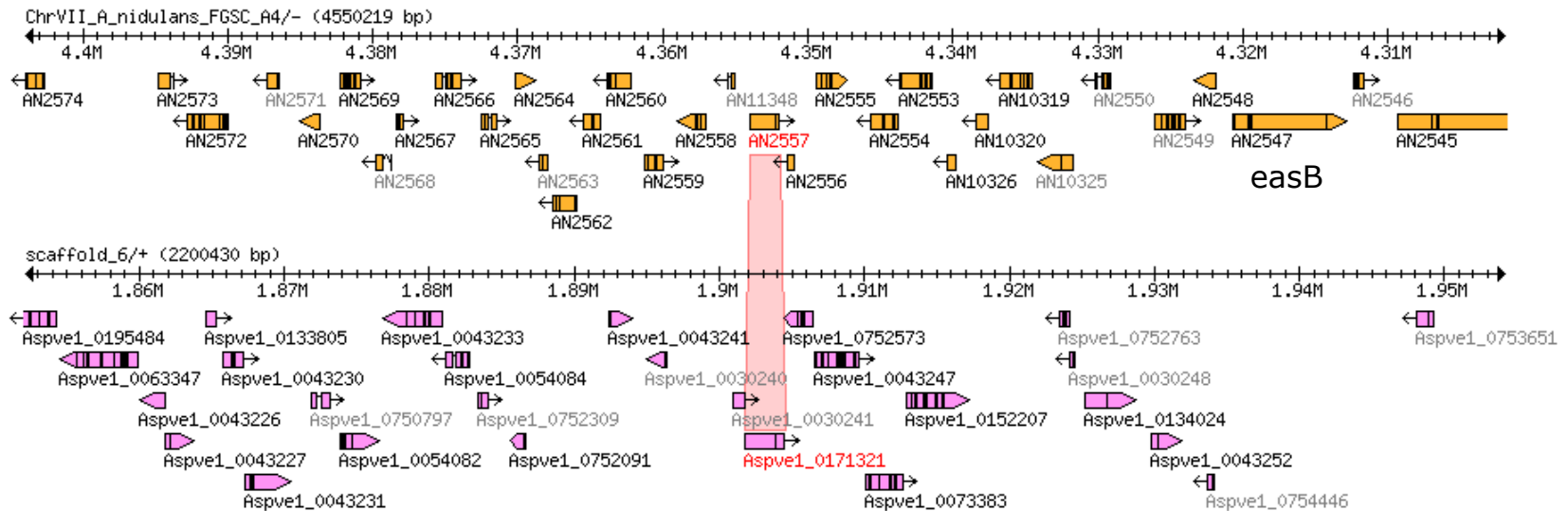


No PKS/NRPS backbone 1

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	ECS
n/a					Pyridoxal reductase	n/a	AN9179	ECS
n/a					Transketolase	n/a	AN9180	
n/a					Protein of unknown function C2H2 and Zn(2)-Cys(6) transcription factor	n/a	AN9181	
n/a					Hydrolase	n/a	AN11195	
n/a					Beta-glucosidase	n/a	AN9183	
n/a					Transmembrane transporter	prot_ID_567	AN9184	
n/a					Protein of unknown function	prot_ID_80	AN9185	ECS
n/a					Acid phosphatase	prot_ID_677	AN9186	
n/a					F-box protein	prot_ID_184	AN9187	
n/a					Protein of unknown function	prot_ID_783	AN9188	
n/a					Protein of unknown function	prot_ID_287	AN9189	
n/a					Protein of unknown function	prot_ID_1133	AN12140	
n/a					Protein of unknown function	prot_ID_1075	AN9191	
n/a					Protein of unknown function	prot_ID_564	AN9192	
n/a					Protein of unknown function	prot_ID_78	AN9193	
n/a				cetL	Protein of unknown function	prot_ID_675	AN9194	

No PKS/NRPS backbone 2

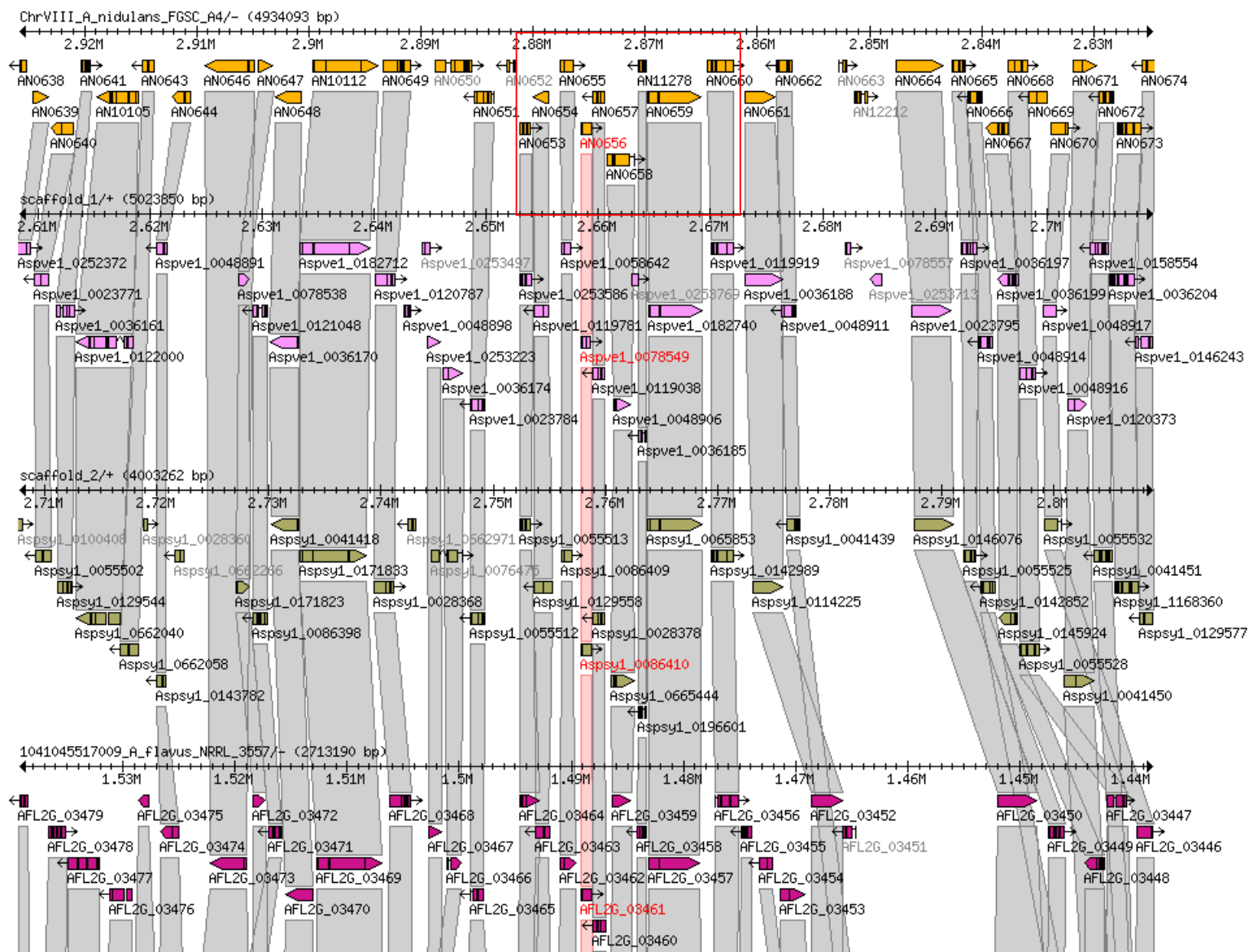
No manual prediction made



No PKS/NRPS backbone 2

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID
n/a					Tyrosine kinase	prot_ID_212	AN10325
n/a					Transmembrane transporter	prot_ID_365	AN10319
n/a					Protein of unknown function	prot_ID_597	AN10320
n/a					Protein of unknown function	prot_ID_1033	AN10326
n/a					Protein of unknown function	prot_ID_979	AN2553
n/a					Protein of unknown function	prot_ID_303	AN2554
n/a					Serine carboxypeptidase	prot_ID_1119	AN2555
n/a					Protein of unknown function	prot_ID_451	AN2556
n/a					Methyltransferase	prot_ID_1259	AN2557
n/a					Protein of unknown function	prot_ID_330	AN11348

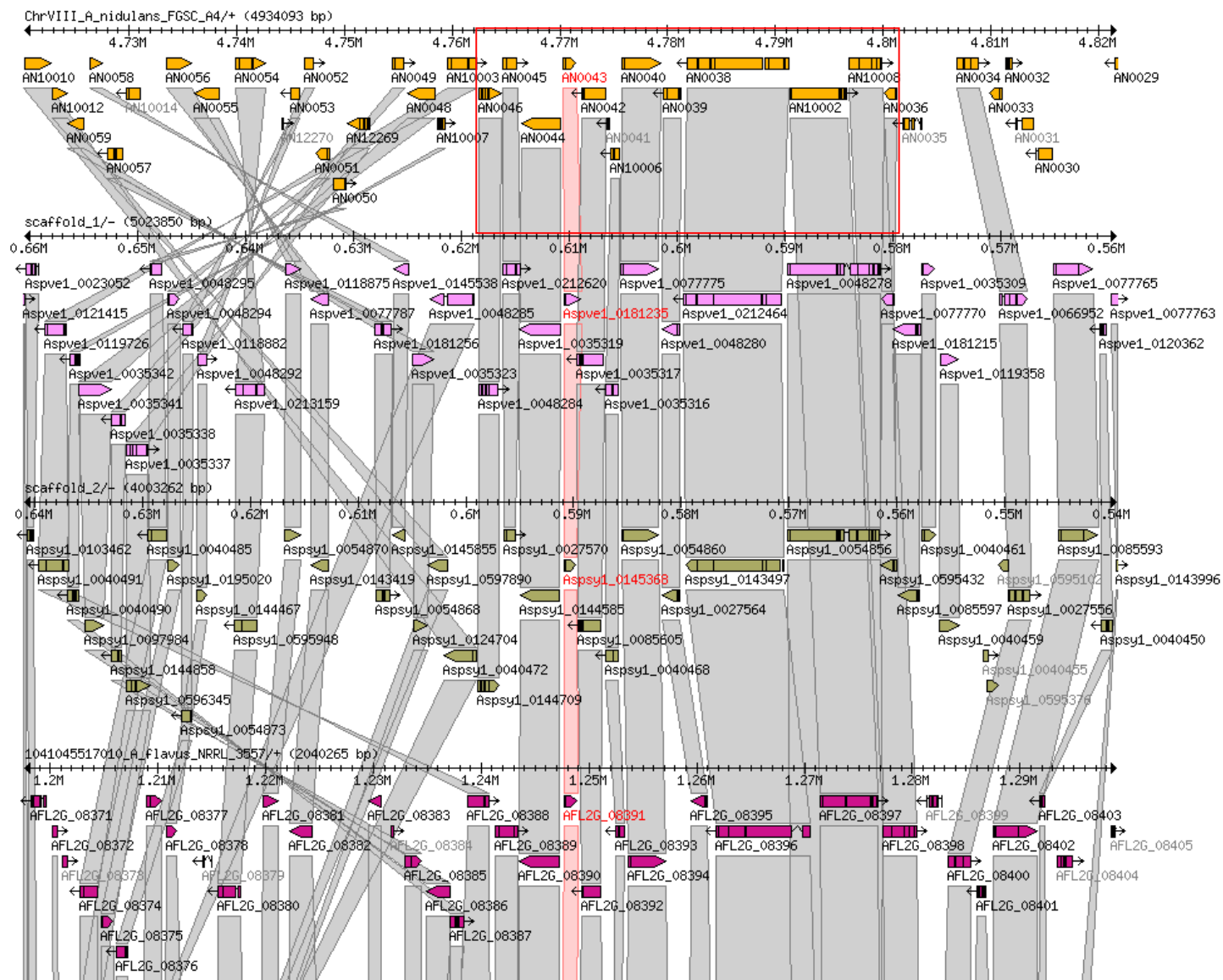
No PKS/NRPS backbone 3



No PKS/NRPS backbone 3

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	prot_ID_1442	AN0650	
n/a				fadA	Alpha subunit of a heterotrimeric G protein	prot_ID_212	AN0651	
n/a					Protein of unknown function	prot_ID_666	AN0652	
n/a					Zn(II)2Cys6 transcription factor Ortholog(s) have farnesyltranstransferase activity, role in terpenoid biosynthetic process and mitochondrion localization	prot_ID_1130	AN0653	ECS
n/a						prot_ID_1593	AN0654	
n/a				sepM	serine carboxypeptidase Has methylase domain involved in ubiquinone/menaquinone biosynthesis	prot_ID_368	AN0655	
n/a					Mitochondrial outer membrane protein	prot_ID_824	AN0656	
n/a					Copper-activated transcription factor	prot_ID_1299	AN0657	
n/a					Ortholog(s) have role in cristae formation and integral to mitochondrial inner membrane, mitochondrial crista junction localization	prot_ID_73	AN0658	
n/a						prot_ID_1139	AN11278	
n/a					Protein of unknown function Allantoin transporter; transcript is induced by allantoin and by uric acid and is repressed by ammonium	prot_ID_526	AN0659	
n/a						n/a	AN0660	ECS

No PKS/NRPS backbone 4



No PKS/NRPS backbone 4

Gene id (SMURF)*	Gene positions	Gene distance	Annotated_gene_function (SMURF)	AspGD gene name	AspGD manual annotation and notes	antiSMASH ID	Gene ID	
n/a					Protein of unknown function	n/a	AN0036	
n/a				culD	Ubiquitin protein ligase	n/a	AN10008	
n/a				nup192	Nuclear pore complex protein	n/a	AN10002	
n/a				atmA	1-phosphatidylinositol-3-kinase	n/a	AN0038	
n/a					Protein of unknown function	prot_ID_1262	AN0039	
n/a					DNA-directed DNA polymerase	prot_ID_539	AN0040	
n/a					Protein of unknown function	prot_ID_1004	AN0041	
n/a					Transmembrane transporter	prot_ID_1477	AN0042	EP
n/a					Transferase	prot_ID_252	AN0043	
n/a					Single-stranded DNA-dependent ATPase	prot_ID_705	AN0044	EP
n/a					Protein of unknown function	prot_ID_1175	AN0045	
n/a					Histidyl-tRNA synthetase	prot_ID_1632	AN0046	
n/a					GTPase	prot_ID_1168	AN10003	
n/a					Domain(s) with predicted zinc ion binding activity	prot_ID_858	AN10006	