

Ben Slimen, A., Yazbeck, R., Elbeaino, T. & Digiario, M. (2026). Identification and characterization of two isolates of Bougainvillea chlorotic vein banding virus (*Badnavirus venabougainvilleae*) in bougainvillea plants from Italy. *Phytopathologia Mediterranea* 65(2): 301-308. doi: 10.36253/phyto-17358

Supplementa Unknown ry Table 1. List of *Bougainvillea* samples analyzed in the study, including corresponding virus survey results.

Sample code	Variety/ place of collection	Viruses included in the survey					
		BCVBV		CIYMV	CMV	INSV	TYRV
		Mini Thai	Apulia 1				
	Valenzano						
O107	Unknown	-	-	-	-	-	-
O108	Unknown	-	-	-	-	-	-
O109	Unknown	-	+	-	-	-	-
O110	Unknown	-	+	-	-	-	-
O114	Unknown	-	-	-	-	-	-
U4	Don Mario 7581 P.1	-	-	-	-	-	-
U5	Don Mario 7581 P.2	-	-	-	-	-	-
U6	White Jamaica	-	-	-	-	-	-
	Monopoli						
P31	Don Mario	-	-	-	-	-	-
P32	Don Mario	-	-	-	-	-	-
P33	Don Mario	-	-	-	-	-	-
P34	Lady Mary	-	-	-	-	-	-
P35	Lady Mary	-	-	-	-	-	-
P36	Elizabeth Angus	-	-	-	-	-	-
P37	Elizabeth Angus	-	-	-	-	-	-
P38	Harlequin	-	-	-	-	-	-
P39	Harlequin	-	-	-	-	-	-
P40	Skarlet	-	-	-	-	-	-
P41	Skarlet	-	-	-	-	-	-
P42	Jamaica white	-	-	-	-	-	-
P43	Jamaica white	-	-	-	-	-	-
P44	Jamaica white	-	-	-	-	-	-
P45	Rubiana	-	-	-	-	-	-
P46	Rubiana	-	-	-	-	-	-
P47	Sanderiana	-	+	-	-	-	-
P48	Sanderiana	-	+	-	-	-	-
P49	Mr Roock	-	-	-	-	-	-
P50	Mr Roock	-	-	-	-	-	-
P51	B.spectoglabra	-	-	-	-	-	-
P52	B.spectoglabra	-	-	-	-	-	-
P53	Mini Thai	+	-	-	-	-	-
P54	Mini Thai	+	-	-	-	-	-
P55	Mini Thai	+	-	-	-	-	-
10.05.22	Sammichele di Bari						
C1	Unknown	-	-	-	-	-	-
C2	Red flower	-	-	-	-	-	-
C3	Pink flower	-	-	-	-	-	-
C4	Orange flower	-	+	-	-	-	-
C5	Orange flower	-	-	-	-	-	-
C6	Red flower	-	-	-	-	-	-

(Continued)

Supplementary Table 1. (Continued).

Sample code	Variety/ place of collection	Viruses included in the survey					
		BCVBV		CIYMV	CMV	INSV	TYRV
		Mini Thai	Apulia 1				
	Terlizzi (Nursery 1)						
O50	Sanderiana	-	-	-	-	-	-
O51	Sanderiana	-	-	-	-	-	-
O52	Red flower	-	-	-	-	-	-
O53	B. glabra	-	-	-	-	-	-
O54	Mini Thai	+	-	-	-	-	-
O55	White flower	-	-	-	-	-	-
	Terlizzi (Nursery 2)						
O56	Orange flower	-	-	-	-	-	-
O57	Red flower	-	-	-	-	-	-
O58	Mini Thai	+	-	-	-	-	-
O59	Ankle	-	-	-	-	-	-
O77	California Rossa	-	+	-	-	-	-
O78	Albicocca	-	-	-	-	-	-
O79	White flower	-	-	-	-	-	-
O80	Albicocca	-	-	-	-	-	-
O81	Sanderiana	-	+	-	-	-	-
O82	Don Mario	-	-	-	-	-	-
	Muro Leccese						
V9	Sanderiana	-	-	-	-	-	-
V10	Sanderiana	-	-	-	-	-	-
V11	Sanderiana	-	-	-	-	-	-

Supplementary Table 2. List of primers used to complete and verify the sequence of BCVBV isolate Apulia 1.

Primers	Seq	Amplification (bp)	Position on BCVBV Apulia-1
BCVBV s7	AACCTAACTGAAAGGTTACC		8179-8198
BCVBV a1	GGTATTGGTAATGCTAAGTC	1100	634-653
BCVBV s2	GACTTAGCATTACCAATACC		634-653
BCVBV a2	CCAAGGTCTGCTGGACCTCT	630	1245-1264
2bs	AGAGGTCCAGCAGACCTTGG		1245-1264
2ba	GGACTGTGGTTCCATAAAGAG	590	1814-1834
3bs	GCTAGCCTCCAGAGGCATAAG		2221-2242
3ba	AGGTGAACGTTTCATCAGATCC	645	2846-2866
4bs	GAGCGAAGCGTGGTGGGAACC		2981-3001
4ba	TAAGGAGTAACCATGTTTGG	830	3791-3810
5bs	CTTGATCAATGGGAATCATC		3953-3972
5ba	GATCCTGTATAAGGATCTTCC	240	4171-4192
UNB.s5	CTGTTGCAGATGATCCCCA		4116-4134
BCVBV.a4	AAAGACACCAATGAATTCCGT	800	4895-4915
BCVBV.s4	ACGGAATTCATTGGTGTCTTT		4895-4916
6ba	ATACTGGTGCAGATGCAGCA	948	5822-5842
UNB s6	CACCACCAGACTGTTTGGTCC		5844-5865
UNB a7	GGTCTTGGACCTTCTCCTTG	1400	7228-7248
7bs	GACCTCACCACATGGAGATA		7168-7188
BCVBV a7	GGTAACCTTTCAGTTAGGTT	1030	8180-8200

Del Moral, L., Pérez-Vich, B., Clapco, S., Duca, M., Velasco, L. & Port, A. (2026). Two genetic groups of *Orobanche cumana* Wallr. in Moldova show contrasting regional affinities. *Phytopathologia Mediterranea* 65(2): 333-342. doi: 10.36253/phyto-17407

Supplementary Table 1. List and sequences of 90 SNP markers used in the study.

index	code_OS	alias	context_sequence
1	OS03091	SNcum-2	TGTGGGATTCGTTTCATCAGAGAATTCATGGTCCGACACGGTGAAC TCCGGATTCATTTTCATCAA TATGAGGAGAGGTGAGTTGA[A/C]GTGACTTCCTATCCGAGATGGCCCAGACGAAAGATTCAAT- CATTTCTGTGCGATCTCTCCAGATATTTAKCCAGCAGACGGCTGAC
2	OS06168	SNcum-6	TAATTTCTTGTTCATAGTTCCAATGGTGAATATACACACACATCATGGCCAAGTTTG- GAGCAATTATAA[G/T]CGAACAAGGAATATATGTAAACTAAACTTAGTAAAGCGTATGTCATT- GCTAAGTATCGAGCAATTATAATCGATAACTGGGCACATATCAGCTAATATCG
3	OS01411	SNcum-11	AACACAAACCCAGCCGGAGGATTCGGCAGASGCAGCGCCGAGTACGGCGACTGAGCTGATTCT GACGGTGACTCCATCACCTCCACTTCACCACCACACT[C/T]CTCGATCTCAAAGTCATCTCCGAC- CAACTTCTTCTTACTCTTACTACTCGTTTCCTTTTCTTCTTCGTCGTCGTTGTCGGCG- GCGCAGCGCGCCGCC
4	OS05160	SNcum-15	TGTCTTCCCCTTCGTCTACCTTTTTGTGCTTGGAAGATTTGGACCCTACGGCTGGCCTTC GGATGTTTCCTTCACTATTCTTGTTCATTTCTGTCCTAT[C/T]GTTATTATGCTTCTTGGCTC- GAGGTTTGTTCGATTTACCCTTTTAAAATCAGGATGTCCGGCTCTTACAAAAGATTTCTCAC- TATTCACCTTCTCGTCC
5	OS01883	SNcum-19	TGTGAACCTACACTTGAAATGGCAATCAGGCATTGTAAATAAAAAGCATACGTAGTCCCGCAATT ACATATAAACAAGAACATACAAAACTTCAGCTT[C/T]TATGGTACTGCCTCTTCAAGCAGCTG- GTTGCTTCACTCCAGAAATGTGGCTCCATTCCTACCAGATCCAGTTCTTCATCAGAATCGA- TAACATCTTCAAAA
6	OS02557	SNcum-22	TCCAAGGACATCCCACTCAAATCCACTATTTCCACCTTGTTTTGATCATCTTCATCTTCTTCTATC CCGGTATTACTCTCCGGTTATCCATCATATGTA[T/C]GTGCCTTTTATTCCTCGTATTGTTCTGTC- CTCACTTGTTGTTGCTGTTGCTGCTGCATACATCATCCTCACATAAATTAATATATCTAACTATA- TATAA
7	OS05647	SNcum-28	ATCGGAAACACTGGTAACAAAAAGTTACAACATTAACCAATATGACTCTTCAAGTGKGATGGAT GGAGTCTACAAGTTTCTACAAACACTCCCGACAAC[C/T]GAGAACTTTTCGAGACTTTTCGTTAC- ATRAAGAAAGTATGTCCAAAAGTGCTTAATAGCAAAGTTTCTATCACCACCGCGATAAAAAAGAA- GGCAATGGCTT
8	OS06124	SNcum-29	CTTCTACTAGGTGGATATCAACAGGTCAGAAGGCATCATTTACCTCCTTGCAATTGCCGTTT GTGGTTTTGCCGCTGGTGTCTCTTTTCGTTTCGGCTC[T/G]TCGTATTTTTTCCTGATTGTAC- CTTCCGTTCTTGCCATCTTTTCTGCTGCGGCTCTATATTTGCGACAAATTTATATTGATCCAC- CGGGTTTTTCCTGCC
9	OS04537	SNcum-32	CATATACTATGGCGGAGACACCACGACAGTAACGTTCCCATAGAACGAAATCTACGTTGCCCA CCCAAGTCCCAAGCTTTATTTGTCACATTTCTTTT[A/C]GTGATTTTACGCATATTAACCCCCACG- GTTGGAATCATATCCTCGCTATGTCTCCTGTAGCAACAACATTAACAAGTGATGTTTTCTCTG- CATTTTGAA
10	OS04917	SNcum-35	GATAGCAGCTCTGTTAGAATATTGGCAAAAAAACATTCCATATGACAAAGTATATAACTTTGATG CATGTACTTCTTTTCCGGCCACTACGAGATATG[G/A]AGCCCTCCAATGTAGAGAATACCATCAT- TAAGGGAGCGACAATGTATAGAAACAATGAATACAACACTAGGTAGATATCCACTGATCAGCT- GTTCCAAAA
11	OS05654	SNcum-40	CWCCCCATGAGCTKGTTCGGTATTTCCAAGTCGWTGTGGATCGTAGACTGCTAGCTA- CATGCATTGCTGCATGGGATTATATT[T/C]JGGTTCGGGAGTCTGGAAATCGTTTGCCATATCCCA- GAACATGTTCTGCAGCTCCTCCATGCTGTAATCCTTTTGCTCAACATGCTGTAATCCTAATTATG GGATCAATCTCATCCGTCGGTGRCTTATATTTAAAGTCACCTTTTGTAACCCTAGCCTCATTTCTTA ACCTTCTGTTTCTCTCTCATCTCTCTCTCTC[G/T]CCCGCCGCATGCTGATATCTTCTCCTC- CCCGTTTCGRACGGCAGWTCCGTTCCGATTTGGAAGGRAATCGAAACCCGTATCAATCTAATGA- TAYGWTAG
12	OS02161	SNcum-42	GGAAAGATGCATGTGATATACGTCATGTCACCTCATTTGTGGTAAAAGCCTATATATTACAGT GTTTATAACCAGAATATATACAAAAATATCTCCGC[A/T]CAGCTATGTAAATTTATGCCTGC- CATATAACTGAACGTACCCCCAGAACAAAGTTTCCAAGGGCACAACACATGCTTATACGACAA- GAAACAAAAATAAGA
13	OS02200	SNcum-44	

index	code_OS	alias	context_sequence
14	OS06130	SNcum-45	TGCCCCCTCTCTATATTTATTTCAGGTACAAAAAGAACAAACATGCAGCTATATGAAACGCTACAAT GACATCTGTACTGGTATACAAAGATAAGTGTCCAC[G/A]TTCTCATCAATGTTATCGGCCCTTCG- TAACTGTTCTACACTAGAATTGACACGAATACAATAATGCATGGAGGAGTAAAGACCCGGAGTTG- GAAAGCGA
15	OS05982	SNcum-48	AGTCTTGAAGAAAGAATCTCTATAACAACCTTTAAAGATAAAAGTTACGCAGCACAATCAGTCTGAA TGTGTCCACTTTATCTGCTCCAGCAGTTTTAGGAA[G/A]TACAAAACCTCGAGTTAATACCTACCG- GAAAGTTACTCGAATCGAAGAAAACCTGGACTGCCAACACTACATTTCGATGCGATCACATCTCAG- GTTKTGCTA
16	OS04831	SNcum-49	CTGCCATTCAATTGGGTAACGATGTACGACTACATAACCCTGATTGTGAGACCGGAAKCTTCCCA AAATTTTCTTGTAGGAATACGAACCGGAGTTTCGAT[G/T]AGATAACGTCAAAATTGGTTTGGGAT- GAAGTGGACCGGCTCAGTTATGCACTGGGTTTCGGAGGTTGCTACGTGAGGAGGAACTAAGGAAT- TAAATATGTT
17	OS05307	SNcum-51	ATGCTGAAGACGAGTTTCGATTTTGATTGTGATTGATCTGTTTCGCATTTGTACCTTCAGCATTTT CTTCAGTTTTTATGGATATTCCATCAGGATAATTTTC[C/T]GATATTGGTTTCTGTCTGGTCTTT- GCTGAAAGAAATCTCAGCAGCTTCAAACCTCTGTATGTTGAAACCCCTKCTCGTTGATTGCTCCAA- GTTCTCCAGGAT
18	OS02762	SNcum-55	TCTCCAACCAACTCAAGAGGYTGYACAAATTGGGTGCTCGTAARTTTGTCTTAATGGCGATATAT CCTAATGGTTGCAGCCCAATGGCTACGGCTAGGGT[C/A]CCGACAAGTAATGGTTGTGTAGAAA- GTCTAAACAGAGCAGCTCAGATGTTCAATGTCCAGTTGAAGAACTTGGTTGATAATATCCGGCCT- MAAATGCCG
19	OS04677	SNcum-63	TCTTAACACAGTGTTYAAGACAAGTTCAAGTTAGTTTACATACCAGAATATTARACCAACACTA GTGCCAACTGCAAATAGAGGAGCTTCAGGGTAT[T/C]GGCKATGAATRAGGCCAATTACTGATCG- TACATCATCCGYCCTTTMAGCAGTGTAAGCAATCAGAYTGTTTGYTYGCAGRATAGAGT- TAAACAARTCA
20	OS05604	SNcum-65	CACATAATACAATGCGAGTTAAGCACGAGACAGAAAGTGAGGATGAGAGAACAAGAATTGATGC AAGGAATTACCATTACGGCCCCCTTTGCCCCCTGCAAA[C/T]GTGCCCAAGGTCGGAGGATCTCAT- GACGAAAAAGGAAAACGGGTTGTTGATTGGGAAAGCCTATCTTCTGCTTATCGGCCCTCAGTAT- CATAACCAAGMTC
21	OS04485	SNcum-70	GGAACATCTTGGGAAAGTGAGCTTAGATGGGTGAGCTAATCATTTCTGTTCAAATTGTTGCTTCAG TAAACTGTGAKAATGTTGGTGTA[G/A]TCAGTGTTGATGATGGCTCTCAGAGTGTAAGAAAYGGCT- GTTGCTAGTTGTGATAGTATTGGTGGTGGAATAAATGTGGAAGGAGTTGGTGGAAATGAGAA AGGGCATCGAAATTGGTGAAATTGAATTGTGGAATCCCTTCTTCACAGGCTATAAACATATCTGCT ACAACATATGCCTACAATACCATTCCCAGCTTCTG[T/G]TGCTCCAGGAAGACAAGCTTCCGGAGC- CGAMGAAACTCTAGACAGTGAGAAACAAGCTACTCAGATACAACCTCCGACTGATGTCGACT- CAACCTTGCTT
22	OS04551	SNcum-71	TGGTGATGATGATGCCGATGGAACCCGGCGCTCGACTCGCTCGCCATGTGTTTGTGCAAATGATT CACCCAATCATGAGAAAAAACTACGGCGACGCTA[A/C]TTGACGGTTTTTCAGATATACATCTGCT- GCAGTAAAGGTTTCCTTTTCTGCAGCGTCTCGCATTACTGAGTCACTGCAATCTCGGTCGAAT- GATCTCAAGT
23	OS03371	SNcum-75	AAAGCCCGACTGGCTCGTCTCTGCACGAAGCCTCGACGTCAGAAAGCTCGGACTCGACGCTGTG CGGGTTCGACAATATCGGCCTCGACGTTGTTCCACT[G/A]AAATCGATCTGAAATTCGTAAGCG- TAAACTCCTTTTCACTATCGGGTATATTTTTCGCTGGACTATTCTCGACCGGATTTCTAGCTGAC- CATTACTGT
24	OS04771	SNcum-76	ATGGATAATTCAAGAAAATTGTATTTTATGATGACAAACCAAGATATACTGAACAATATTTTTTTTT CCTATAGTGAAYGTG[T/C]GAGTTACATCAAGATATCAGAAAAAAAAGAGTTGGAATCCGAGGTC- GAAACAAAACACAACATGATGTGTGTGTGTGTGTGTGTGTGTGTGTGTATGC
25	OS04724	SNcum-77	GAAAGAACAATTTTGGCCAACAAAAAGGTAACCTTCATCTTTAGGMTATACTCCAGAACTA TGTTGAGTTTCGTATCTTCGGCCACCAWATGGTCCGT[C/A]ACATACACAACGAAATACAATG- CAAACCTTTTTTTTTTTTTTTAGTTCACTTACCATTAGTGTTCATGCTTGTGAAA
26	OS04904	SNcum-78	CTCTCTCATACTCTTCTCCATCAGAATCAGTTTCTTCTTCTTCAATTATCGTCCACAAGTTTCTTGA TTTTTCAGATATGATGACATCATCATGTGTGCAT[G/T]TTGTTGGGATCCATTTTTTTTTTTCCTC- CTCTGTTAGTGGGTTTTTCAGGAATTTAGAGAAGGGTAAAGGCAAGG
27	OS05130	SNcum-79	ACTCCTTCCAAGTTCAAACACTCCGTTCAAAGTTCAACACTTCGTTCAATAATGGTGTAGTGTAGA GATACCATGTAGCTTCAAAGTTCAAAGTTTACAAGCT[C/T]AATAGGGGTTCAATTAGGGCTTCAA- GTTCAAAGTTCAAAGTTCAAAGTTCAATTAGTGTTCGATTAGGGTTTCGATTAGGGCTTCGGTGTTC- GATTAGTTCT
28	OS04912	SNcum-85	

index	code_OS	alias	context_sequence
29	OS05042	SNcum-87	TAATTTTTTCACACTTAGATCTTTTCATTTCTCTCCAGAAACCTCACCATTTCAGAAAATCTAAACCA CATTTCTTCTTTTCACTTTTACACCCTCCATCCGC[T/G]CTTGCTTTTACAATATTACAGCCCATAGGA- GATTTCCCCCTCACTGATCCCATTAACCCCGTCTCGAGATTATTTCGATGAACTTACCCGTAGACTG- GATAT
30	OS05885	SNcum-89	TCTTCAAAAATTCACGATGTTGGCCCGAATCATGCCATCTATCTTGCCATGCTCATCTGGAGAAAAC ACCACTTTTCTCTTTTCATTTTCTTGTTTCAGCTATT[C/T]GTTGGCAGTCACAGGTACCATCGCCC- CCCCATCAAAAGTAAGCAAATCTTTTAATTCCTTATATACCCCTGACGACACTATTACATTACTAC- TACTAGTA
31	OS05038	SNcum-90	AAGTATAAATCTAGTTAAACRCAAGAATCTCATTTGATGATAACATCGGCAATAACGGTTGGG AGAGACATCCAAATTCGAAACATGTCTCAACTTGTGG[T/G]GACAAGTTTCAATCCTATTTT- GTTACGGGTAGAGTCATCCTAAGTTGAGTTTATTTGAAGATGGAAATTTTACCTTATCCGATGG- GAAGTCGCCACA
32	OS03788	SNcum-91	TAATCTGATGTCTCTCTGAAAAGCCTTTCTACTCCAATATGTGAGGACTGATCACAATTTGGAAT CATCCTTTTTCAGAATTCCCAGCTTCTTTTCGACCG[A/G]ATCCCGGGCCCCAACGCAACGATCG- GAACGCGCCCTTGATCTCTTCATGATCTCTACTGCACTGCTGCACCTTCTTTTTTTCTTCAG- GAAATTATGAGC
33	OS05106	SNcum-92	RGTGRTAAKTGWYCAATYCATGAAMCAATTGRTCATGGGTTCAACTGCTGCCGAGGGTCCAAAA AATGGAAATAGCCTCTCTACCCAAGGGCAAGGCTGC[T/G]TACTATCTTACCTTCTCGGACCCT- GCAAATGCGGGATATACTGAGTACGTTCTGTTTCGTTTCYGTTCGGTGTCCGTTTCCGTGTAC- TACCAATCTTC
34	OS05831	SNcum-94	CTGAGGAATGGCGCCTTAGCAGAGCCCATTCCGAAGCTTGGCCCTGCAAAAGATTGGTGAC ATGGCCATCTCGCCACATGTAACATCAGCACCCAAAAT[T/C]TTGCACACCTGGCGAAAAGGTA- GATTTCTACTGTCTGTGAGGGGAGCAAGATAGAGCTTTTCACGGAAGTCAATGAGTTTCCTTTC- CCTTGGGTGTAAT
35	OS05974	SNcum-95	TGACCCTCAAGAAGTATGAGTTGATGTCCAAAACAAGGTCTCCGTCGATTGGCTTCTCGGGTT AGGCCCGAGCCTCGGCATTGTGCGCGTCCGGGGTGT[T/C]GGGATCATCCACACCGAGCTCK- TTTCGGGAATCCCGGCTATTTTCTCTCACTTTGTACCAATCTTCCCGCCTTTCACCAAGTCCTT- GTTTTCTCTTGCG
36	OS04641	SNcum-98	ACTAGGGAATTTAGAAGCACATGGTAAGCAATCGTGCCAAGTCAACATTCTGAAACCGCATTTCTA CCAAACAGTTGGAGTGCAGTCTCACATTACCAG[C/A]CACAGCATAACCAATGACCAAAATATTG- TAATACATTACTTTATGAACATACCTCTGCTTCATATAGTTTTGTAAG
37	OS05601	SNcum-100	TTTCTAACAACTTTATGATCGATAAACACCGAATAAACCGASGCCTGTTCCGGCAGGTGMCACR TACTGATGCTCGAAGCTCCCCCTCCAGAAGTAGA[C/T]GGGTATGGATCCCGCCAGCATGCAGTC- GAATGCGGATCTTCGGGTATACCCGTACCTTTGGGCTGCAAGCAGAAATCCGAATCCAGAAAC- GACTCCAGT
38	OS04769	SNcum-101	GAGGAGATTGTTAACGAGAGCAGACAGCCGAATCGAGTGAGATTGGCAGGTATGGAGATAGAAG CTTGCGGTATTTTGTATGGGRTTTTAGCTTCGT[C/G]CGAAGCGGACTTGCATTGCCTCGAT- GACACGTCATCCGCCCCCTCCGCCTTCGTCAACGTCCATTATCGTACTGCGTGTGGGGTGG
39	OS03929	SNcum-102	AATTATCCCTATTTTTTGGAGTCGGAAAACCTGCCTGAGTAGATCCTCGAATATGATAGGAAGGC TTTTCCCTCTCAGATGGCTTCTTTGCTGCATTTTC[C/G]CTCTCAGACAAATCAATCACTAGACG- CATCAATGTCWTCCACCACAAGTATCGATCTATTCTCCGTAGAAATTAGCAGATTCCTCAAATC- CGAATTGCGT
40	OS04664	SNcum-103	ATCAAATTTTGAAGGAAGTTGGTGATAGCTGAGGAAAACTCTGGTTTATTGATGAAATGAAGAT CAAGATAAACCCCAATCTGCGGAGATGATACTGC[A/G]ATCGTTGCCACGAGAGCCTCCTGA- TACTCACCAGTGCAGCAGATTTATCAGCAAAAACATTTGGAGGCCTTGATGCCAGTCAATTG- CATTCTTCAG
41	OS04526	SNcum-104	CAGCTCGAGCTTTTCTTGATTTCATATCTGATGTGTTTGTATACCTTCTCGTTTCTTTTTCTCTT TGAGCGTGAAATTGCATACTCTCGTTCTGGGCT[A/G]TTCAATTACGTGATCCAGCTATAGGAA- GCACTTGAGAGGTCTTGAAATCAAAAGGACCATACGACTGAACTCCTTGGAACCATTTCAG- TACTCGTAT
42	OS06018	SNcum-105	ACATAACAGATTCCAAAGTTTTATGCCACGACCATCTCTCATGAGACTCCCAYTAATAAAACCCG TTTGACGAAATTTAGATAACAAAAAGTTAGGTCC[G/A]TACAGGGAATTTACTTGCTGGCACT- TAGTTTCAGATTTTCGATCTTGAAGGTTTCAGCAACAGCTCATTAGAGTTCAAGTACACCTTGTTG- GTTGAAGCAGC

index	code_OS	alias	context_sequence
43	OS04498	SNcum-107	AGCTCAAGCGGATCAAAGAAAGACAAAAGCTCGCAATACAGCAAAAAAGAACGCTAAGTCTAC CACGGACCAGGCCCGGAGGAAGAAAATGGCCCGAGC[C/G]CAAGACGGCATTTTGAAATACAT- GTTGAAGCTCATGGAAGTCTGCAAGGCTCGTGGATTCTGTGTACGGCATTATTCCCCGAGAAGG- GAAAGCCCCGTCAGCG
44	OS04550	SNcum-109	TAGGTTTTCCAAAATGTACCGTTTCGAGTAATGTCAGTTGTTCCATCTAGATACTGTGCTCCTGAA TCAAATAGGTACATACTATTTCGGATCAAGTTCAGC[A/G]CATGTTTCTGCCTCAGGACTATAATG- TATAACCGCACCATTGGAACCAACAGATGAGATAGTCGGGAAACTCAACCCCGTAAAAATGCTGT- TAATAAAACA
45	OS04704	SNcum-111	CAGACTCCCAAGTTTTCGAAGATACAGATATCAGATACGAGAAGAAGAAGAACTGTGCCGCGCG TGGAATCTATGTATCGAGTGAGAAAAGAGATACTA[T/C]TAAGAAAAGAAGGGTTTTCGCCGACA- GGGTTTTAATAAGGAGATCGATGTGCGAGATCGAGAATCCGAGGAGAAAATTGGAATTTGCGAGA- TGCAGAGGTAA
46	OS04587	SNcum-114	TGTACATCTGTGCCCTGGAAAACTGTTCAAGTCTCTTCATCATGGGTAGCCATCAAACCATCT TTCTTCAACAAACCCACGGAGGTTTCGGTTCGTCCTCCCAA[C/T]GAGCATAAGAACCCGAACAC- CTTCACTTGCTTTCTTCTTAAGGAGCTCACCTAGGGTTATGTCACCTCCGGGCTTTTGTCTC- CTGGAGTCCCTTATCAAA
47	OS04603	SNcum-115	CCAGATCCGGATCTCGCTTATCAGTATTATTACCAGATGGTGAGGTGCAAGAAAAGCAGACTTTC TGGCCGAAAAAAGACTCAGCGCAGAGGGCATCGAA[T/C]GGAGTGAAAATCGACATCGACATG- GCCAGCTGAAATTAGATTATTCTTTTCTGCGGAAGRTTAAAGAGAGAGGGGAGAATTGAGA- AAACTTTCAATGTTT
48	OS05532	SNcum-116	TTCTCGTTGGCTTTTCCGTCTTCACTTCTCATTTTCTTCAATTCTTCGATCTGTTTTCGTGAG CTTTCGAGCTTCTGAAGAAGGTGCGATTTTCCGGTTT[C/T]GGCCTTCTCTTTTGAATTCTC- CAAATAAGTAAGCCCATCAGATGGKCACTTCTTTGAKCATCATGTTTCTATTCTAACCATTG- GTCCTCAGATACT
49	OS06055	SNcum-117	CCGCAAGCCCTCACACCAGCCATGAAATGCTGTGCGACAATCTTCACCAATGCGTTCTATGAAT TTGGTGAAATGAGCAAAAGAATTGACAGTAAAGATAA[A/C]TGGCCGATATTCAACCTTGTCCT- CGTCTTGGGTGCTGGAAGGTCTGCGACATCCATGGACGATAATATATTACATGTGAGCTATTT- GCCAGGAAATCCA
50	OS05886	SNcum-118	TGAAGAATTGGGACAAGAGTATAAACTCGGTGACAATAGTAGCTGGGGAGTGATTCCCATAAAC GGGATGAAGTCAACCTGAAGCCAACCTCTCCGCTGC[C/T]GAGCCGGCTAGTGCAACAGCTAC- GAGCCCTCCAATCATTATCACAGTTGCTTTCCCTAACCTTGACGTTTTTCTTGGTCATGAAGTATAA- GGATGCCCAA
51	OS04663	SNcum-121	TCTTGGATCTCGACTTATTGACTCTCTTTCTCTTTGGCAACTCTGTTGTCAATGCATAAATCTT GACAGCAAATAGTCCATCAGGAAATCCCTTTTGATC[T/C]TGACCACAACAAATACTATGACTA- CATTAACAGGTTAGTTTCCAGACCAAAGCCACACCTCAAATCTCCAGGAAATATGAGCAAT- CATCAGTATTCT
52	OS05121	SNcum-123	TCCGCTCATCATCTTGTGCAATACAAAGAAAAACACAAGAGTGAAGAGGTTGCATATAGACTTGG AGTCAATACGAAGACTTGACATGGGTATAAACTGC[C/A]GCAAAAGCAGTGGGAAGATGGATAA- GAGTTGGCTGCTCAGAGCCACACCAAGTGCCATTCTGCCAGACCTTACAGCTCCTAATAAGTT- GCTAAGGTTAAC
53	OS04688	SNcum-125	TATACAACGAGGTGTTAGTCTCTCCACCGTGTGCTATGCTGATACCATCCACAACCCCTATAAT CCTCGACCACAGACTCCATGCTCGTTTCGTAGAATAC[A/G]CTGTGCTCCCCACAGCCATC- GACTTCATTCTTATCAACTTTGTGTCTTGAATGGATGAGAAGACCCGTTCTCTGGCTAAAG- TATCCCATAATCGTGT
54	OS05911	SNcum-127	AATAAATAGGGCAACGCAGAAAAAGGAGAGAGACAGATTCGAGGAGTGCGTTAGAGGGGGTTAG GGTTAAATATAGAGGGGTGCTTTTTCCTACGACGAA[G/T]ATCGAGTGATGGTGCGATCTTA- GACGTTGGTTGGCCTTGGGGCGAAGGTGTGAAGCATCTAGAATTTCTAC
55	OS05571	SNcum-128	ATAAAATAGATACCAACATAAAGGTTTCATGCTTGTTTGATGTGATTGCTGTTAGAGAATTAATTTG GTTGAGTAAGTATTTATTAATAATTGTTTTTGTA[T/C]GATTTGGTGCATTAGTTAATAATCATCATC- CTCTGCACATTAATCCTAATTAGGTCGTGGTCAGTGACATGAAGAATATAGTTTAATTAATGGT- CAAAA
56	OS04725	SNcum-129	TCGTATTTGAGTTCAATGCAGTCATACGGGTTTCGAGGAGACGACAAATCCATAATCTAGCAGAA AAAGATCGTTATTCAAACAGCCGTAATTAAGTTCCA[C/A]AGGATCATCCTGTTTAAATATGTGCTC- CAGCAATGACCTTCACAAGCATGTTACCATTGTTTGCTTCTTTTCTTGTACAATTCAGCRTTGTG- CGGTGAAG

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57	OS04728	SNcum-130	ACAGCTGTAATGGCGGGAAGGCCACCTCCTCGAATTCCAAAATACTTTGTTAGAAAAATGGCGCT TCTGCATATAGCAAAGGATACAGCAAGGGCAGCCG[C/T]GGTCTGCAGTACAGATATCTTGCCAC- CGGAATTCGGTTCTTTCATCAAGACCGGCACCGGCTGCTGATGATGACGACTCGGCAGGTATTT- TAGACGCCAAT
58	OS05128	SNcum-131	TCAGACCCTTCATCAGAAAAATAGAAACAAGGTGGCTGATTGATGTTGTAGGGATGTTGTTA TTTGTTTGAGAATGAATTGATCCATTTTAATCGCTTA[G/A]ATACTTCCATCCTTGTGATGTAAA- GGACTTTGAAGAGAACATGCCAAACCCTGAATTCGCACTGCTCTCAAGTGATGTCTGCAAAATTT- GATGCTAACATA
59	OS04739	SNcum-133	AAACCAAGACAGACAAAAATGGCTACTTCTTCTTCATGCCACAGAACTGACTACGGCGGGCTT TCACAAGTGCAAGGTTTTCTAGTTTCTTCTCCGGT[C/G]GCGGCATGCAACGTCCCCACCAAC- CTCCACGGCGGAGTCGCCGGCGCTTCACTGATCCCCACTGCAAAGTCGCCGTTAAGGCGC- CGTTCCAGCTTTTCA
60	OS06060	SNcum-134	CTCCCACCCACAATCGGCATTTCTCTCACGACATCCATCACATGGTTCCGCCCAA- GCATGCTTATGCTGCTCCC[A/G]TTGTACTCCCCTTCAGTGAATGAAAACGTCACAACCATTAG- CAACGCCAGGTCATTTTGTGCGGAAAATGCATATGTTCTTGTGCCCCGTCGGATGATCT
61	OS05820	SNcum-135	AACACATGATTTTCTTCTAATCATTCAACAATTTTGACGACTGTCATATTCCTAACAGAACCT ATACCCACACAGAAAAAGGGCGAACCAATAACCCCC[G/A]GAAAATACAAAGGTACCACCAA- GAACACACAATCACTTTGATCCAGCAAATTTACTCATCATCTTCGCTATGATTGGAGCCAC- CTTTGGGTTACCTTGAT
62	OS05856	SNcum-136	TCAAATAAACAGATACGAACATAAATAAGAAGGAACAGCTCAAGAGATTTTACATTGACATAATT CCCATACATTCCTGGGCTGCGAGGACATTCATAAC[T/C]AGAATTGGCATCTGCATCAGGGCAA- GGGGTGCAATTTCTAAAAAGTGGCAATCCAAATGAAATAACGGAAGTTATCAAGGACACAATA- CACACTTCAATA
63	OS04773	SNcum-137	CAAGCATACTCCAAGTGATTATACGATACCACCAATCCATCGCCCAGATTTTGGCCCCCTTTCTTC ATAAACTAGTCGCCCCCGTCATCACTGGAATCG[C/T]CGCCATGGCCGATGGCGCTGATTTTG- GAGCTTTGGGCCCCACCAAGAAAAGCCATGTCTTTTATGGGATGAGATTAGAGAACTAGTCTTG- GCTGGAAATTA
64	OS05652	SNcum-139	CTTTCAGTACCATCAATTTTTCAGGGGAGTTAACCATATGAACTGAAATTCCTCGTCATCAA GACCTCCATAAGCTCCCAAGTGTTGATAACCGAGT[C/T]TGGGGATAGAGGGTCCTCAGAGC- TACCAAAATCGCGAACCTTAATCATCTGGGCCGTGCGATTTCGCAAAATCCCGGCCGTTGAGA- CTGGGTTTTGTGGCT
65	OS05734	SNcum-140	GCCTGAGTTTGTTAACATCGGATTGCTGARCTGGCTTCAGGAAGAATTCTTCAGCCCCCTTGTT CCAAGCAACTGTCGATTCTCGACGGAATATTTCCGA[T/C]GACATTATCACAACCTGGGATGTC- CTTCAACATCTCCGATTCCTTTATTTTCTCAGAAGATCGAAACCGGTTAGTGCAGGCATAGAG- TAATCTGTGATGA
66	OS05060	SNcum-141	GACGACACGCTTTTCTTCATCAGAACCCTCACTGTCGGTAGTGCGAATATATTT- GTTGGAAGGCACTTCCGTAGTGTTCTCCACTGGTGCAATTTCCCC[C/T]CACTGC- CATAGTCGTCACCTCTTTCATCCTCGGTGTCAGTGTCAACGCTGAAAAAATTTTCGA- CATCGTCTCTAAAACAACGACAGTAAACTTCTCAGT
67	OS05125	SNcum-142	TTAAACAAGTCGTCCCAACAGGTGAAGCATTTTCACACAAAATGAGCAYGAGAAGTGCT- GTTTCGCAAAGACAATAAATTTGTCAAATACATGAAAGCCCC[A/C]ATCAGAGTCCTGGCC- CGAGCCCGTGATTTCTACGTGCAGAGCCTCACGTCTGCGCCGGCGGCAGCCTATTACG- GCAACAACATGGGCTGCTCATATC
68	OS05231	SNcum-143	GTAGCCACGCCACTTTCTTCATTAATCGACGGCGACACGAAACCGTTTCGCGGCAATGAATGTAGC CCTGTTGGTCGGAAGCTCAGTCGTACGGTTGTCTC[G/T]GGAGCGACCGCGGCGAAGTGGTTG- GATGTTGCGAGTGGAGGTGGTCGGCGAGTCGGAGGCCATGAGCTCCACCTTGCTGAGGGAGAC- CACCAGTTGTTT
69	OS05316	SNcum-144	AAGGTGGGGGTGGCCCACTCAAGTTCGACTGCCCCGTTAACTTAATAAAAGTCCGCTTGAGCCTA CGCAGCTCCGGCAGACCAACGGGCCTCGAGATCTC[A/C]ACATTGGGCAAGTTCGGCCCGAGT- GAAACACCATTGAGCGGGCCTCCCATGGCCCGTGACTGTGCTTCTACAATCATATTCACGAC- CTTAGAGCCGCTC
70	OS05690	SNcum-146	ARAACCCGCCCTATCATAYGTGTCCTTATCCCTACTTCTATACCCCGAACCATCAGATTTTGCATG AGWGTGTGTGACCACATCRTTCACATAATCTCTA[T/G]ATCGGTGCTCTTTMTCCGACCTTGAG- TAATCCGAGTTAATGTTGTATCGTGAGTCCCGGCTAGAACGATAGGATGACTTAGAATAACCTC- GATCATAGTC

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71	OS05048	SNcum-152	GCCGGAGTCTCCCCCATTTGCAAGAACTAGGTATCATTCTCCGTTCCCTTAACCACAGGAA ACTGTGGCAGCGATTGAGCAAATGGTACCTCGTCAGCCG[T/C]CTCTACATAGTCTCT- GATCTCTCTAATAGCCCCTGAACCTACTAAACAGTCAGCCAGAACCCTCTGAAGCACCAGTAAACC- CTTGCGCCATGCCCAAGTCT
72	OS06082	SNcum-154	TACGCCTCTTCGTTGAAGGTATCTAACGACAACCCAATGATGGAGATAAGTTTCGTGAAGTGG GATCGGGCTCCCTTTTTTCGTCAATCACTTCGGCGTCA[A/G]AGCTCTTTATAGCAATATGAC- CTTTTGGAAGTCGATGTTGTAGTAGTATTTGTTGGAGACTGATCCGGGTTCCAATTTCGAATT- TAGGTGAGAGGAAGAC
73	OS05697	SNcum-157	CATAGCGACCGGAACGGTCAAATATTGCACAATACACAGCATTTCCTATGTCCTCTTAACCTCTTCA CGTTTTGCATCTTCGGCACCATAGCTGATGGTTT[G/A]GCAATTGCATAACATGCAACACGAATA- GACGGAGCACGGTGGTGTTTTGCAAAGCCCCCTCCAATTTCTCTCAAGCTAAGCCCTCGAAC- CTGATCAGCTT
74	OS05788	SNcum-158	TCACGCCAAGTGACTCCGCCACCCTGTCCAACCCACCATAAAGCCCCTGACAGAATTTTCATCAA ATGTTTTACATCATAAACCCGGTTTCCAAAAATGAC[C/T]TTCATCAAATTCAGAACTCGGAAA- GAGTAGATAACCAAAATCGTACCCACTGTGGAAGGTGATGTAAGTAATATTCTCGTTGCACAACAG- GCCAGAAGA
75	OS05151	SNcum-160	ACTCAAATCAGACCCAGGTTTATWCAACCCGTTTCAACCCGTAAGTCTCAGACCCATCACCGCTCCA GTTTTTCGCTGCCATCACCAATCAGTGGAGGACAAT[A/G]GCCGATGTTTTTTTGTTCGCTG- CAATCCGGCCGCTRAATTCRTGTATACTCRTGTGTGTGTTTATASGGGCGTTTTCTGTGTGATT- TAGAGGGAGAG
76	OS05165	SNcum-161	TTATGTTGGCAAGCCGACATTTAAATACACAATATTGTCTTGCAAATTAATAGATTGGCGGCCT TACTTGCACTTGGAAGAAAGACGCCTATGGTTG[A/G]CCCAAGTGGTCGAGCCTAAGTCAT- AATTTGTGGTGGTGGGGCCACGTTACACAGTGCCGACTAGTCAATTAGTCGCTCAGTTAGAC- CTCTATCGACTC
77	OS05681	SNcum-163	TATGAATTGTGGATACAGGATACGCAACACAAAAAATCCTTCAAACATTTTGAAAATGAGAA ACATCTTTCCGACAAGAGGAGCCGATAACAGTCAAAAC[A/G]ACACTGGCACATATAACAT- CAAAAGTTTAAACGATAAACTCGATGGGCTTAAAAAAAATTCCTATCGTCCCATCAATAACAC- GAAAAAAAAAAAAAGAA
78	OS05805	SNcum-164	ACGCAGCCATTAACACGTTAAACTATAGATATTTCGGCATACATCCAAGTCTCGCAAATTCCTCC CATAATTCCCTCGACCTTATTTGTCAAACCTTCTCT[G/A]TAAAAACCGACCATAACCACATTCAAT- GTATTGCGATTTCGGGAAAATTCCTTACCGCATTTCCCATTTCTAGCCACATTCTCGACATCAC- MACTAAAGA
79	OS05920	SNcum-165	TTGAGCACCAAACTTGAACCTCGGGAGGAGTTCAGCCTGTGGGAACGAACCATTCGACGGGA CATCGAGCAGCAGATCCTGTTTCATGGCTTCATCACCA[C/T]AATCTGAACAAAAGGGGCTTTC- CAGACTGAAGAAAGACGAGCAACCCTTATCTATTATTACTTCATCCTCATTGTAGCTTGGCCA- CATCGTTATCCTTTT
80	OS05646	SNcum-166	CACATCGGCGGTACCACCACCAAAGCTAATTCCTTATGACCTTATAGTCGTCGGTTTCGGGATCGTA TCCGAGACCATTGTTCGATAAATAGGTATCAGGG[A/C]TGGTGGGCGGGGAAGTAATTTAAGTT- GTTTGGTTGTTAAGTTGACAATAACAGCCTTGACATCCTCAACATCAACATCACAATCAAAACTAT- TAAAGTA
81	OS05394	SNcum-167	CTAGATGGACCGGCTTCTACAAGATCAGATTTGAGGCCGTTTTTCAGTGTGGGTATTTGTGGAGG TGGCTGAAGAACTCGTGCCTGCGTAGGGATCGACAG[C/G]TGGCAGTCTTTCGTGGGAGGCG- GATTGAAGGGAGGCGTTAATAGCCATGGCTAGCTGTTTCGTCTTCGGAAGATGGAGGTGCAGTT- GCTGGGGCAGTAGAG
82	OS05524	SNcum-172	GCAGTGCGTTGTAAATCAGCCCTACTTCACTGGTGATTCCAGCAGGGTACAACAATAGAAACGT GCTGTACCTCAGCCAAAGAAGCCACGATGGCGCGAA[C/T]CCGAATGTCTCCTTGACGCCGAA- GAACGAGTAGCGGATTATCTCGGTGACTGACCAGCTAATGACGAGGGATACAACGAAGAAATG- GTCCCGGATCTCGG
83	OS05590	SNcum-174	AGAAAGTCCAAAGGTTTTCGATTTGAAATATCCGATTGGGGGTTTTGTTAACTGGAAGTTGAGCGC CGGAGGGAGATGAGGGAGTTTCAAAACCCTAGCCGA[A/G]AGGAGGGTAAGAAGTGAAGAAAGG- GAAGAGTGAGCGCCAAAAGATGAAACTTCTATTYTTGTTTTGGCGGCGTCGAGGAAGT
84	OS05790	SNcum-175	GTGGRCAACGTGGGAATAACCTTCAAGAAAATCCTGCAGGGAAATGATTACTTGAGTGAGAG AGTCAGCCTGTTCTTGGTGGAGGGAAATAGGAGGGCGA[G/A]GATGATGCTGGAGTTGATC- TATAATTTGCATTACGGAAACTAGAGATCCATAGGCAGCCATTTCCGACTTTTTTTTCTGGGTTT- TAGAACAGAGCACCAG

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85	OS05748	SNcum-177	GGCGGCCGTCCCCGACATTTAGCTGCATCTCTTTGCAAGCAAACCATGGCAACAAGTGTA TGAGTCCATGCAATGCCGGCGACGGAGGCAACGACGCA[A/C]ATGCTATGGMGGTCAAATTT- GCATCGGAAAAAAATTTGGATTATTCCGAAAATTGATGAACCCAGTCCAGAAATTCAGCAA- GCAAAGCAAACAATCCTG
86	OS05922	SNcum-183	ACGTCAAAAGATTTTCATGTAATTGATCCGGCAGGTGCAGGTGGCTCGCCCTTCTCAGGACCAG GATCTGCAGAACATTAGGAAGCACAAACAACATGTGAA[A/G]CAGAATTCAGGTGAGCAGGT- GAAAAGTATAATCGATTTGTCTAATAGCAGCTCCTGCTGTTAATATTTCTCAAAGAGATCAATTCAT- GATCGGGCTTGA
87	OS05929	SNcum-187	TGGGTGTTGCATCAACCCGAAACATAAATTCTGTCATCACTTTATCTAATGACAGATTTCCAGACC TGGAATCCTAGGGACCCCAAAGCGAGGCCATCT[G/A]GAAAAGGTTTCGCAACTTATGAGGGGG- GAGATAATGTAAATTCCAGAATTGATTAACCATGCTAAATCGTGATGACCAAGACTCACAAAT- GTTGAATCAT
88	OS05933	SNcum-188	GGCCTGGATGTCCTGGATCTGGGTTGGAGACAACCTGGTTGAGCCCAATAGGTGTGTGGTGCTG CTGACCCAGACCATATATATAGTCATGAGCAGAGGCC[C/T]GATACATACTGGGTTGCTCAGATT- GAGCGGATGAATAGTAGGAATTGTATGGAAAGGAACCTGGAGGTGGAAGGAGAGAAGGTGGAATT- AGAATAATATTG
89	OS05937	SNcum-190	TCGGACTCRGGATCCCGACGTTGAAATCGAGATGGGATAGGGGCAATGTGGAAGATATCGAAT TTAATCCTCCGATTAATCCGTTTGGTCCGACTCCGAG[C/T]TCCAAGCTCGAGTTGGGCATCG- GCGGGCAAAGGGACGAAATGGGCCGGCCAAAAACTTGCCGGCTAAAGAGCAAACCCGGTC- GAGTTCGTCTTTTAGCC
90	OS06008	SNcum-193	TTGTTCTGGCCTCGATACACAATAGCACCTTTAGAAGGACCCATGAGCCGATTACGGACAAACA GAAATCCAGCCCATTGCCCGTTCTGAATGACTTGAG[G/C]GAAAGGGGATTGCCAGACACTGC- CTTCCCAACTGTGATGCCGATCGAATTGAAGGTTGCCTCCGGTGGCATTGAAAATCATGCA- GAGGGTCGAGGTCCCA