

Viruses and viroids of grapevines revealed by NGS in Czech Republic

Petr Komínek, Marcela Komínková Crop Research Institute, Prague, Czech Republic kominek@vurv.cz

Aleš Eichmeier, Miroslav Baránek Mendel University in Brno, Czech Republic

Grapevine is known to be infected by a large number of viruses and viroids.

The genomes of all the viruses that inhabit a particular organism or environment are called **VIROME**.

Using next generation sequencing (NGS), virome of grapevines selected from the territory of the Czech republic was evaluated.

- 8 Grapevines of different cultivars originated from Czech Republic were analyzed by NGS
- Small RNA were isolated from phloematic tissues
- Libraries were sequenced with Illumina HiScanSQ (SELGE, University of Aldo Moro, Bari, Italy)



G1 Kober 125AA



G2 Pinot noir



G3 Laurot



G4 Müller-Thurgau



G5 Guzal Kara



G6-G8 Chardonnay

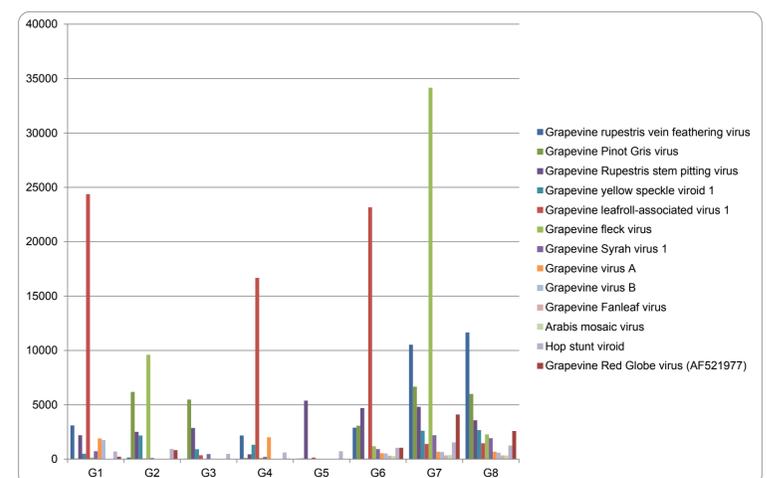
RESULTS:

Detected viruses:

Grapevine leafroll-associated virus 1	Ampelovirus
Grapevine rupestris stem pitting associated virus-1	Foveavirus
Grapevine Pinot Gris virus	Trichovirus
Grapevine virus A	Vitivirus
Grapevine virus B	Vitivirus
Grapevine fleck virus	Maculavirus
Grapevine rupestris vein feathering virus	Marafivirus
Grapevine Syrah Virus-1	Marafivirus

Detected viroids:

Hop stunt viroid	Hostuviroid
Grapevine yellow speckle viroid 1	Apscaviroid



Number of reads mapped on reference viral sequences using SOAP aligner 1.11.
X axis - individual grapevines
Y axis - number of reads

Number of unique reads mapped on reference viral sequences using SOAP Aligner 1.11

VIRUS-ref. Acc. Nos./GRAPEVINE sample	G1	G2	G3	G4	G5	G6	G7	G8	TOTAL
Grapevine rupestris vein feathering virus (AY706994.1)	3113	148	43	2 181	53	2 902	10 535	11 659	
Grapevine Red Globe virus (AF521977)	225	831	5	59	3	1 052	4 115	2 591	
Grapevine Pinot Gris virus (NC_015782.1)	65	6190	5486	113	78	3 079	6 676	5 998	
Grapevine Rupestris stem pitting associated virus (NC_001948.1)	2205	2517	2872	447	5388	4 701	4 818	3 579	
Grapevine leafroll-associated virus 1 (NC_016509.1)	24365	72	364	16 674	151	23 167	1 398	1 460	
Grapevine fleck virus (NC_003347.1)	159	9599	39	129	24	1 192	34 166	2 287	
Grapevine Syrah virus 1 (NC_012484.1)	734	119	479	209	12	928	2 212	1 940	
Grapevine virus A (NC_003604.2)	1908	11	13	2 025	21	553	688	690	
Grapevine virus B (NC_003602.1)	1766	14	7	25	4	533	660	601	
Grapevine Fanleaf virus (NC_003623.1)	4	3	4	5	3	322	349	345	
Arabis mosaic virus (GQ369530.1)	2	2	1	2	3	281	375	341	
Grapevine yellow speckle viroid 1 (HQ222363.1)	503	2182	920	1 333	50	59	2 619	2 682	
Hop stunt viroid (EU382210.1)	708	949	486	618	734	1 042	1 555	1 250	
SUM TOTAL	35757	22638	10720	23820	6524	39811	70166	35423	244859

Using NGS approach, Grapevine rupestris vein feathering virus and Grapevine yellow speckle viroid 1 were recorded in the Czech Republic for the first time.

Published in:

Eichmeier A, Komínková M, Komínek P, Baránek M (2016). Comprehensive Virus Detection Using Next Generation Sequencing in Grapevine Vascular Tissues of Plants Obtained from the Wine Regions of Bohemia and Moravia (Czech Republic). PLoS ONE 11(12): e0167966. doi:10.1371/journal.pone.0167966