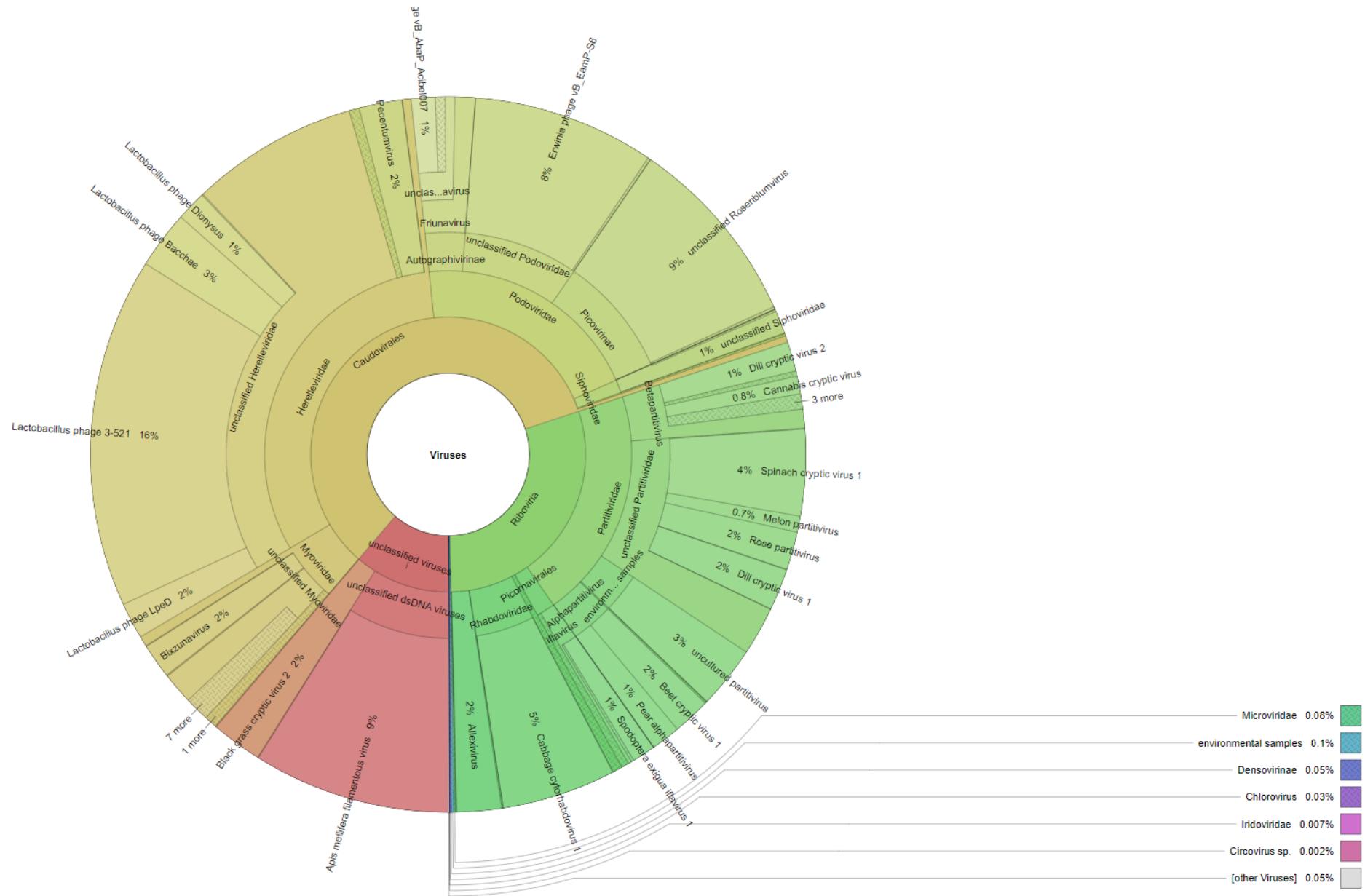


## Přílohy

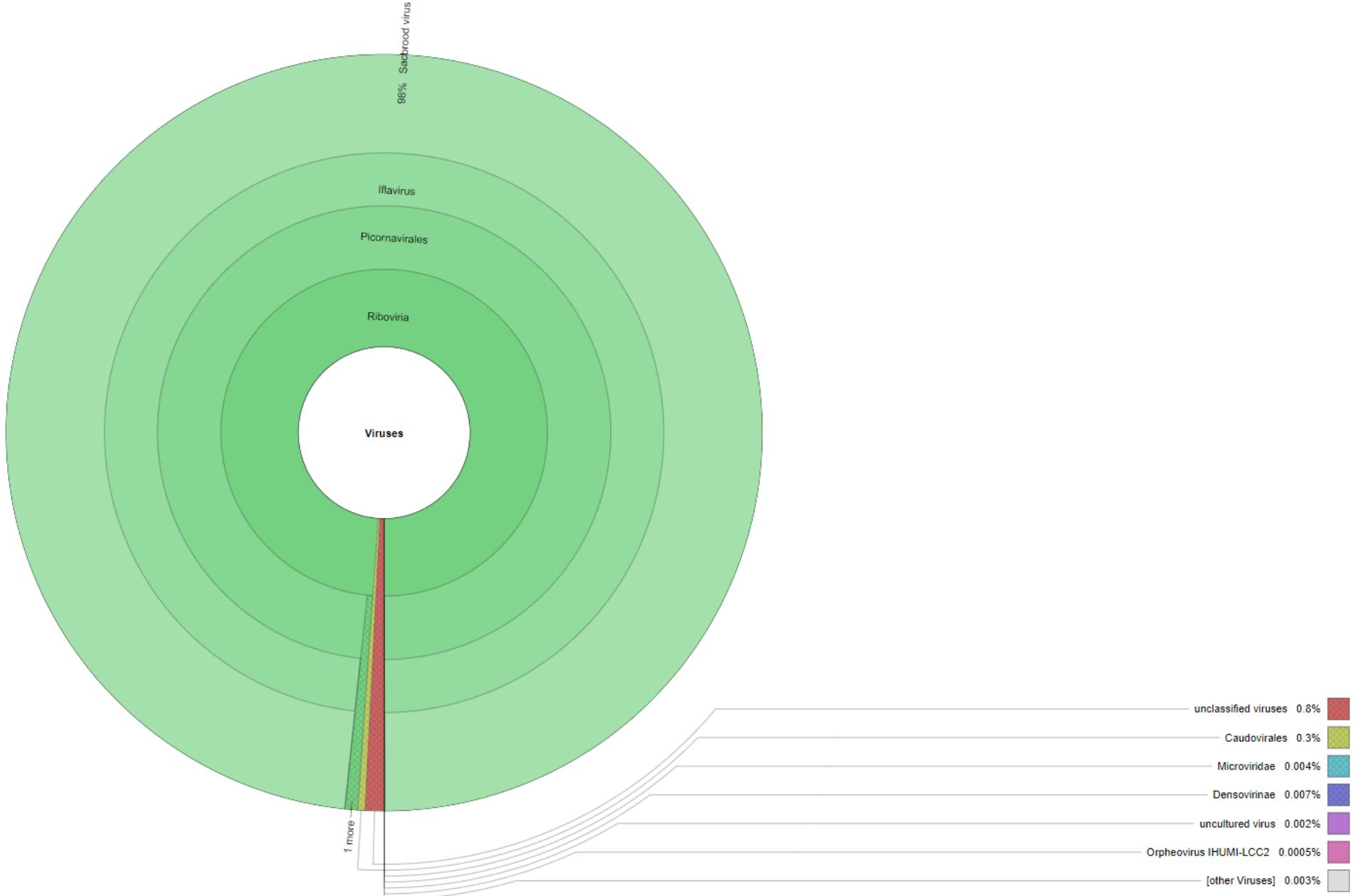
A



B



C



D

Virus (zkratka)	Taxonomie	Genom	Přenos				Interakce			Infekce			Mimo A. <i>mellifera</i>
			Orální	Kontakt	<i>Varroa</i>	Vertikální	<i>Varroa</i>	<i>Nosema</i>	Jiné	Larva	Kukla	Dospěl.	
Deformed wing virus (DWV) komplex	Picornavirales <i>Iflaviridae</i>	+ssRNA	+ <sup>1</sup>	-	+ <sup>1</sup>	+ <sup>2</sup>	P/O <sup>1</sup>	N <sup>3</sup>	?	+/- <sup>4</sup>	+/ <sup>1</sup>	+/ <sup>5</sup>	++ <sup>6,7</sup>
Sacbrood virus (SBV)	Picornavirales <i>Iflaviridae</i>	+ssRNA	+ <sup>8</sup>	-	~ <sup>9</sup>	+ <sup>10</sup>	~ <sup>11</sup> /-	-	?	+/ <sup>8</sup>	+/- <sup>8</sup>	+/- <sup>8</sup>	+ <sup>12</sup>
Black queen cell virus (BQCV)	Picornavirales <i>Dicistroviridae</i>	+ssRNA	+ <sup>2</sup>	-	-	+ <sup>10</sup>	-	P <sup>13</sup>	?	+/- <sup>14</sup>	+/ <sup>15</sup>	+/- <sup>14</sup>	++ <sup>7,12</sup>
Acute bee paralysis virus (ABPV)	Picornavirales <i>Dicistroviridae</i>	+ssRNA	+ <sup>16</sup>	-	+ <sup>17</sup>	+ <sup>10</sup>	P/O <sup>18</sup>	?	?	+/~ <sup>18</sup>	+/ <sup>17</sup>	+/ <sup>19</sup>	++ <sup>7,20</sup>
Israeli acute bee paralysis virus (IAPV)	Picornavirales <i>Dicistroviridae</i>	+ssRNA	+ <sup>21</sup>	-	+ <sup>22</sup>	+ <sup>21</sup>	P/O <sup>22</sup>	?	?	+/~ <sup>23</sup>	+/ <sup>23</sup>	+/ <sup>23</sup>	++ <sup>7,20</sup>
Kashmir bee virus (KBV)	Picornavirales <i>Dicistroviridae</i>	+ssRNA	+ <sup>9</sup>	-	+ <sup>24</sup>	+ <sup>2</sup>	P/O <sup>24</sup>	?	?	+/~ <sup>9</sup>	+/ <sup>25</sup>	+/ <sup>25</sup>	++ <sup>7,20</sup>
Chronic bee paralysis virus (CBPV)	Nezařazené	+ssRNA segment.	+ <sup>26</sup>	+ <sup>26</sup>	~ <sup>27</sup>	+ <sup>10</sup>	-	P <sup>26</sup>	?	+/~ <sup>28</sup>	+/~ <sup>28</sup>	+/ <sup>29</sup>	+ <sup>20</sup>
Lake Sinai virus (LSV) komplex	Nezařazené	+ssRNA	+ <sup>30</sup>	?	~ <sup>30</sup>	+ <sup>10</sup>	-	?	?	?	?	?	+ <sup>31</sup> /?
<i>Apis mellifera</i> <td>Nezařazené</td> <td>dsDNA</td> <td>+<sup>33</sup></td> <td>-</td> <td>-</td> <td>+<sup>33</sup></td> <td>-</td> <td>-</td> <td>Kinetoplastida N<sup>34</sup></td> <td>+/-<sup>33</sup></td> <td>+/-<sup>33</sup></td> <td>+/<sup>33</sup></td> <td>+<sup>35</sup></td>	Nezařazené	dsDNA	+ <sup>33</sup>	-	-	+ <sup>33</sup>	-	-	Kinetoplastida N <sup>34</sup>	+/- <sup>33</sup>	+/- <sup>33</sup>	+/ <sup>33</sup>	+ <sup>35</sup>
Bee Macula-like virus (BeeMLV)	Tymovirales Nezařazené	+ssRNA	?	?	+ <sup>36</sup>	+ <sup>10</sup>	?	?	?	?	?	?	+ <sup>36</sup> /?
			?- neznámé ~-neprůkazné				Interakce/Otevřená infekce P-pozitivní N-negativní			Přítomnost/projev			

## **Seznam použité literatury**

1. Möckel, N., Gisder, S. & Genersch, E. Horizontal transmission of deformed wing virus: pathological consequences in adult bees (*Apis mellifera*) depend on the transmission route. *Journal of General Virology*, **92**, 370–377 (2011).
2. Chen, Y. P., Pettis, J. S., Collins, A. & Feldlaufer, M. F. Prevalence and Transmission of Honeybee Viruses. *Appl Environ Microbiol* **72**, 606–611 (2006).
3. Doublet, V., Natsopoulou, M. E., Zschiesche, L. & Paxton, R. J. Within-host competition among the honey bees pathogens *Nosema ceranae* and Deformed wing virus is asymmetric and to the disadvantage of the virus. *J. Invertebr. Pathol.* **124**, 31–34 (2015).
4. Chen, Y. P., Higgins, J. A. & Feldlaufer, M. F. Quantitative Real-Time Reverse Transcription-PCR Analysis of Deformed Wing Virus Infection in the Honeybee (*Apis mellifera* L.). *Appl Environ Microbiol* **71**, 436–441 (2005).
5. Yue, C. & Genersch, E. RT-PCR analysis of Deformed wing virus in honeybees (*Apis mellifera*) and mites (*Varroa destructor*). *Journal of General Virology*, **86**, 3419–3424 (2005).
6. Loope, K. J., Baty, J. W., Lester, P. J. & Wilson Rankin, E. E. Pathogen shifts in a honeybee predator following the arrival of the *Varroa* mite. *Proc Biol Sci* **286**, (2019).
7. Gisder, S. & Genersch, E. Viruses of commercialized insect pollinators. *Journal of Invertebrate Pathology* **147**, 51–59 (2017).
8. Bailey, L. The multiplication and spread of sacbrood virus of bees. *Ann Applied Biology* **63**, 483–491 (1969).
9. Shen, M., Cui, L., Ostiguy, N. & Cox-Foster, D. Intricate transmission routes and interactions between picorna-like viruses (Kashmir bee virus and sacbrood virus) with the honeybee host and the parasitic *varroa* mite. *Journal of General Virology*, **86**, 2281–2289 (2005).
10. Ravoet, J., De Smet, L., Wenseleers, T. & de Graaf, D. C. Vertical transmission of honey bee viruses in a Belgian queen breeding program. *BMC Vet Res* **11**, (2015).
11. Shen, M., Yang, X., Cox-Foster, D. & Cui, L. The role of varroa mites in infections of Kashmir bee virus (KBV) and deformed wing virus (DWV) in honey bees. *Virology* **342**, 141–149 (2005).
12. Murray, E. A. et al. Viral transmission in honey bees and native bees, supported by a global black queen cell virus phylogeny. *Environmental Microbiology* **21**, 972–983 (2019).
13. Doublet, V., Labarussias, M., de Miranda, J. R., Moritz, R. F. A. & Paxton, R. J. Bees under stress: sublethal doses of a neonicotinoid pesticide and pathogens interact to elevate honey bee mortality across the life cycle. *Environ. Microbiol.* **17**, 969–983 (2015).
14. Leat, N., Ball, B., Govan, V. & Davison, S. Analysis of the complete genome sequence of black queen-cell virus, a picorna-like virus of honey bees. *Journal of General Virology*, **81**, 2111–2119 (2000).
15. Bailey, L. & Woods, R. D. Two More Small RNA Viruses from Honey Bees and Further Observations on Sacbrood and Acute Bee-Paralysis Viruses. *Journal of General Virology*, **37**, 175–182 (1977).
16. L. Bailey, B. V. B. *Honey Bee Pathology*. (Elsevier, 1991). doi:10.1016/C2009-0-02695-6 (1991).
17. Wiegers, F. P. (Wageningen A. U. Transmission of honeybee viruses by *Varroa jacobsoni* Oud. (1988).
18. Ball, B. V. & Allen, M. F. The prevalence of pathogens in honey bee (*Apis mellifera*) colonies infested with the parasitic mite *Varroa jacobsoni*. *Ann Applied Biology* **113**, 237–244 (1988).
19. Bailey, L., Gibbs, A. J. & Woods, R. D. Two viruses from adult honey bees (*Apis mellifera* Linnaeus). *Virology* **21**, 390–395 (1963).
20. Sachman-Ruiz, B., Narváez-Padilla, V. & Reynaud, E. Commercial Bombus impatiens as reservoirs of emerging infectious diseases in central México. *Biol Invasions* **17**, 2043–2053 (2015).
21. Chen, Y. P. et al. Israeli Acute Paralysis Virus: Epidemiology, Pathogenesis and Implications for Honey Bee Health. *PLoS Pathog* **10**, (2014).
22. Di Prisco, G. et al. Varroa destructor is an effective vector of Israeli acute paralysis virus in the honeybee, *Apis mellifera*. *Journal of General Virology*, **92**, 151–155 (2011).
23. Maori, E. et al. Isolation and characterization of Israeli acute paralysis virus, a dicistrovirus affecting honeybees in Israel: evidence for diversity due to intra- and inter-species recombination. *Journal of General Virology*, **88**, 3428–3438 (2007).
24. Chen, Y., Pettis, J. S., Evans, J. D., Kramer, M. & Feldlaufer, M. F. Transmission of Kashmir bee virus by the ectoparasitic mite *Varroa destructor*. *Apidologie* **35**, 441–448 (2004).

25. Bailey, L., Carpenter, J. M. & Woods, R. D. Egypt Bee Virus and Australian Isolates of Kashmir Bee Virus. *Journal of General Virology*, **43**, 641–647 (1979).
26. Toplak, I., Jamnikar Ciglenečki, U., Aronstein, K. & Gregorc, A. Chronic Bee Paralysis Virus and *Nosema ceranae* Experimental Co-Infection of Winter Honey Bee Workers (*Apis mellifera* L.). *Viruses* **5**, 2282–2297 (2013).
27. Celle, O. *et al.* Detection of Chronic bee paralysis virus (CBPV) genome and its replicative RNA form in various hosts and possible ways of spread. *Virus Research* **133**, 280–284 (2008).
28. Seitz, K. *et al.* A molecular clone of Chronic Bee Paralysis Virus (CBPV) causes mortality in honey bee pupae (*Apis mellifera*). *Scientific Reports* **9**, 1–11 (2019).
29. Blanchard, P. *et al.* Evaluation of a real-time two-step RT-PCR assay for quantitation of Chronic bee paralysis virus (CBPV) genome in experimentally-infected bee tissues and in life stages of a symptomatic colony. *Journal of Virological Methods* **141**, 7–13 (2007).
30. Daughenbaugh, K. F. *et al.* Honey Bee Infecting Lake Sinai Viruses. *Viruses* **7**, 3285–3309 (2015).
31. Runckel, C. *et al.* Temporal Analysis of the Honey Bee Microbiome Reveals Four Novel Viruses and Seasonal Prevalence of Known Viruses, *Nosema*, and *Crithidia*. *PLoS One* **6**, (2011).
32. Parmentier, L., Smagghe, G., de Graaf, D. C. & Meeus, I. *Varroa destructor* Macula-like virus, Lake Sinai virus and other new RNA viruses in wild bumblebee hosts (*Bombus pascuorum*, *Bombus lapidarius* and *Bombus pratorum*). *Journal of Invertebrate Pathology* **134**, 6–11 (2016).
33. Gauthier, L. *et al.* The *Apis mellifera* Filamentous Virus Genome. *Viruses* **7**, 3798–3815 (2015).
34. Hartmann, U., Forsgren, E., Charrière, J.-D., Neumann, P. & Gauthier, L. Dynamics of *Apis mellifera* Filamentous Virus (AmFV) Infections in Honey Bees and Relationships with Other Parasites. *Viruses* **7**, 2654–2667 (2015).
35. Hou, C., Li, B., Luo, Y., Deng, S. & Diao, Q. First detection of *Apis mellifera* filamentous virus in *Apis cerana cerana* in China. *Journal of Invertebrate Pathology* **138**, 112–115 (2016).
36. de Miranda, J. R. *et al.* Genome Characterization, Prevalence and Distribution of a Macula-Like Virus from *Apis mellifera* and *Varroa destructor*. *Viruses* **7**, 3586–3602 (2015).
37. Schoonvaere, K., Smagghe, G., Francis, F. & de Graaf, D. C. Study of the Metatranscriptome of Eight Social and Solitary Wild Bee Species Reveals Novel Viruses and Bee Parasites. *Front Microbiol* **9**, (2018).