Pepper mild mottle virus in different water matrices

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Background:
Pepper mild mottle virus (PMMoV), a plant virus belonging to Virgoviridae, has recently been suggested as a potential viral indicator for faecal pollution in aquatic environments, since it has been found to be abundantly excreted from healthy human subjects.
Methods:
The occurrence, amount and diversity of PMMoV was investigated in water environments by nested RT-PCR and TaqMan based quantitative PCR. During 2017-2019, 251 water samples (92 urban wastewaters, 32 treated effluents, 16 surface water samples, 9 estuarine samples, 20 seawater samples, 67 groundwater samples, and 15 drinking waters) were analysed.
Results:
PMMoV was detected in 73/92 (79%) wastewater samples, 22/32 (69%) treated sewages, 11/16 (69%) river samples, 6/9 (67%) estuarine samples, 5/20 (25%) bathing waters, and 9/67 (13%) groundwaters, whilst drinking water samples tested always negative. Mean viral concentrations (genome copies/L) were: raw sewage 4.2×106, treated sewage 7.4×105, river 3.2×103, estuarine waters 9.6×102, seawaters 3.0×102, groundwaters 7.7×101.

Conclusions:
This study highlights the significant occurrence of PMMoV in aquatic environment in Italy, and a clear gradient of viral prevalence and concentrations from polluted to clean waters (wastewaters to drinking waters).

Key messages:
- PMMoV is ubiquitous throughout the water cycle in Italy with different concentrations.
- Studies are needed to evaluate the suitability of PMMoV as a viral indicator for human fecal pollution in waters.