



First report of *Eggplant mottled dwarf virus* causing flower breaking and vein clearing in *Hydrangea macrophylla* in Germany

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In May 2013, an unknown disease was observed in hydrangea (*Hydrangea macrophylla*) in a nursery in North Rhine-Westphalia, Germany. Symptoms observed consisted of flower breaking (Fig. 1) and vein clearing/banding (Fig. 2). Hydrangea, native to Japan, is a deciduous shrub which is mainly used in landscaping as bedding plant or at borders. Many cultivars are of economic importance mainly due to the decorative flowers.

Examination of leaf dip extracts by electron microscopy showed the presence of bullet-shaped and filamentous virions resembling those of rhabdoviruses and potexviruses, respectively. The potexvirus was identified as an isolate of *Hydrangea ringspot virus* (HdRSV), a virus commonly found in hydrangea. However, the symptoms observed were not previously associated with the presence of HdRSV, which usually causes ring- or chlorotic spots on leaves or remains symptomless. The putative rhabdovirus was mechanically transmitted to and maintained in *Nicotiana benthamiana*, showing leaf mottling and crinkling upon infection. Symptomatic hydrangea and *N. benthamiana* leaf material was tested by RT-PCR for the presence of rhabdoviruses using the degenerate primers Rhab F (5'-GGATMTGGGGBCATCC-3') and Rhab R (5'-GTCCABCCYTTTTGYC-3') according to Dietzgen *et al.* (2013), which were designed to amplify a conserved part of the rhabdovirus L gene. Amplicons of the expected size of ~900 bp were obtained and comparison with GenBank sequences revealed up to 99% aa (97% nt) sequence identity to *Eggplant mottled dwarf virus* (EMDV; e.g. GenBank Accession Nos. HG916824 or HG916825), and thus identified the hydrangea isolate as an isolate of EMDV. The presence of EMDV in symptomatic leaf material was confirmed by a strong ELISA reaction with an EMDV-specific antiserum (DSMZ AS-0836), which was originally raised against a Moroccan tomato isolate. Electron microscopic

investigations on embedded and ultrathin sectioned leaf material from *H. macrophylla* revealed rhabdovirus-like particles budding into perinuclear spaces (Fig. 3).

EMDV was first reported from eggplant in Italy in the 1960's and is endemic in the Mediterranean basin (Martelli, 2011). It is mainly found in solanaceous vegetables but was also identified occasionally infecting ornamentals of the genera *Hibiscus*, *Lonicera*, *Pelargonium* and *Pittosporum* (Pappi *et al.*, 2016). This is the first report of EMDV infecting *H. macrophylla*. Whether the observed symptoms are caused by EMDV alone or by synergistic effects with HdRSV remains unresolved. The EMDV isolate is available at the DSMZ plant virus collection under accession no. PV-1127 and the sequence was deposited in GenBank (KX709963).

References

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Figure 1



Figure 2

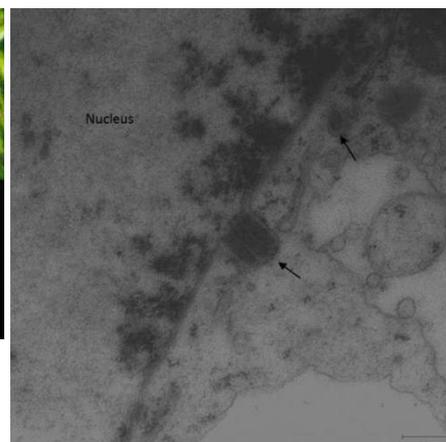


Figure 3

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