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Non-cultivated grass hosts of yellow dwarf viruses in Ethiopia and their epidemiological consequences on cultivated cereals

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Abstract

The yellow dwarf (YD) disease complex epidemics in cultivated cereals grown in a specific period of the year mainly depend on the presence of potential reservoir alternative hosts harbouring both the viruses and the vectors over the off-season and serve as a source of inoculum in subsequent cropping season, further spread being supported by efficient aphid vectors. As such, an extensive and intensive exploration to generate base line information on the identity and prevalence of YD viruses [*barley yellow dwarf virus* (BYDV)-PAV, BYDV-MAV and BYDV-SGV; *cereal yellow dwarf virus* (CYDV)-RPV; and *maize yellow dwarf virus* (MYDV)-RMV] on wild annual and perennial grasses and forage cereals alternative hosts was conducted consecutively during 2013–2015 main- and short-rainy seasons in cereals growing belts of Ethiopia. Random sampling was employed to collect the samples that were tested by the tissue blot immunoassay (TBIA) to identify the YDVs associated with the hosts using a battery of virus-specific polyclonal antibodies. Of 13,604 samples analysed, YDVs were detected in 392 (2.9%) samples, which consisted of various wild grasses, forage cereals and three cultivated crops. YDVs were identified from at least 26 grass species and forage cereals, some of them are new records, and some are previously documented hosts. To our knowledge, this is the first report of YDV infection of *Andropogon abyssinicus* (FresenR.Br. ex Fresen.) (BYDV-PAV), *Avena abyssinica* Hochst (BYDV-PAV), *Bromus pectinatus*Thunb. (BYDV-PAV and BYDV-MAV), *Eragrostis tef* (Zuccagni) Trotter (BYDV-PAV), *Eragrostis* sp. (BYDV-PAV), *Hyparrhenia anthistrioides* Stapf. (BYDV-PAV), *Panicum coloratum* L. (BYDV-PAV), *Polypogon monspeliensis* (L.) Desf. (BYDV-PAV), *Setaria pumila* (Poir.) Roem & Schult (BYDV-PAV, BYDV-SGV and MYDV-RMV), *Setaria australiensis* (Scribn. & Merrill) Vickery (BYDV-PAV, BYDV-MAV and CYDV-RPV) and *Snowdenia polystachya* (Fresen.) Pilg (BYDV-PAV, BYDV-MAV, BYDV-SGV, CYDV-RPV and MYDV-RMV).