

## Product Information: DAS-ELISA

# Barley yellow dwarf virus (BYDV)

# Cereal yellow dwarf virus (CYDV)

Synonym: Barley yellow dwarf virus and Luteovirus "xyz" (Strain-dependent e.g. Luteovirus pavhordei = BYDV-PAV) / Polerovirus (CYDV-RPV)

### Characteristics of cereal-infecting yellow dwarf viruses (YDVs)

Barley yellow dwarf virus (BYDV) and cereal yellow dwarf virus (CYDV) (6) infect cereals and grasses, causing economically important diseases in barley, oats, wheat, rye, corn, and rice (2-8). Historically, virus isolates have been grouped according to vector specificity, virulence, and serology (5,6). For example, five groups have been differentiated in New York State, USA (6) and two main groups were identified in the UK (5, 8).

<sup>5</sup> English classification		<sup>6</sup> American classification				
		Serogroup 1			Serogroup 2	
<b>B</b> PAV-like	<b>F</b> MAV-like	<b>PAV</b>	<b>MAV</b>	<b>SGV</b>	<b>*RPV</b>	<b>RMV</b>
<sup>6</sup> Virulence according to Rochow:						
---	---	strongly virulent	moderately virulent	weakly virulent	weakly virulent	weakly virulent
<sup>5</sup> Severity according to Plumb						
severe	mild	severe	mild	---	severe	---

This classification was disrupted when the viral genomes were sequenced (9). As a rule of thumb YDVs of cereals that belong in genus *Luteovirus* are called BYDV and those that belong in genus *Polerovirus* are given other names (CYDV, Maize YDV, Wheat YDV, BVG=Barley virus G).

Some characteristics of YDVs taxonomy based on the nomenclature (9) of the International Committee on the Taxonomy of Viruses (ICTV) is shown in the tables below:

Tombusviridae						
Luteovirus						
BYDV-PAV	BYDV-MAV	BYDV-PAS	BYDV-kerII	BYDV-kerIII	BYDV-GAV	BYDV-SGV
<i>R. padi</i> <i>S. avenae</i> <i>S. miscanthi</i> <i>S. fragariae</i> <i>M. dirhodum</i> <i>S. graminum</i>	<i>S. avenae</i> <i>S. fragariae</i> <i>M. dirhodum</i> <i>S. graminum</i>	<i>R. maidis</i> <i>R. padi</i> <i>S. avenae</i> <i>M. dirhodum</i>	<i>R. padi</i>	<i>R. padi</i>	<i>S. graminum</i> <i>S. avenae</i>	<i>S. graminum</i> <i>R. padi</i> <i>S. avenae</i> <i>R. maidis</i>

Solemoviridae					
Polerovirus					
CYDV-RPV	CYDV-RPS	MYDV-RMV	WYDV-GPV	MYDV-RMV II	BVG
<i>R. padi</i> <i>S. graminum</i> <i>S. avenae</i>	<i>R. padi</i>	<i>R. maidis</i> <i>R. padi</i> <i>S. graminum</i>	<i>R. padi</i> <i>S. avenae</i> <i>S. graminum</i>	<i>R. maidis</i>	<i>R. maidis</i>

(*R. padi* = *Rhopalosiphum padi*; *S. avenae* = *Sitobion avenae*; *S. graminum* = *Schizaphis graminum*; *R. maidis* = *Rhopalosiphum maidis*; *S. miscanthi* = *Sitobion miscanthi*; *S. fragariae* = *Sitobion fragariae*; *M. dirhodum* = *Metopolophium dirhodum*)

## Specificity and sampling instruction for the BYDV and CYDV reagents

BIOREBA has three reagents available for the detection of different cereal-infecting YDVs by DAS-ELISA (1). They were made against virus strains similar to the main two groups identified in the UK (Type B and Type F) and to a Mexican isolate of CYDV-RPV. Studies in Switzerland showed that BYDV-PAV, -MAV and -SGV isolates as well as CYDV-RPV and MYDV-RMV could be detected with our ELISA reagents (2). Studies in Ireland showed that BYDV-PAV, BYDV-GAV, BYDV-PAS as well as CYDV-RPS could be detected with our ELISA reagents (10). Possibly, other cereal-infecting yellow dwarf virus isolates and strains can be detected with our ELISA reagents as well.

For ELISA, stalks and young leaves are good tissue sources (4). Samples are homogenized 1:20 (w/v) in extraction buffer «General» (Art. No. 110120).

These products have been developed in cooperation with Agroscope, the Swiss centre of excellence for research in the agriculture and food sector.

### Barley yellow dwarf virus-type B (BYDV-B) (PAV-like)

These reagents were made against a BYDV strain which is efficiently transmitted by both *Rhopalosiphum padi* and *Sitobion avenae* and is common in Western Europe (2, 4). Serologically, this strain is closely related to BYDV «Type B» (5) and is similar to BYDV-PAV. The reagents react in DAS-ELISA similarly with the PAV-strain and the B-strain, whereas only to a limited extent with «Type F» (5). Stalks and young leaves are good tissue sources for the ELISA (4).

#### Information on the antibodies

Coating IgG: polyclonal; conjugate: polyclonal

### Barley yellow dwarf virus-type F (BYDV-F) (MAV-like)

These reagents were made against the BYDV «Type F» (5) (a MAV-like isolate), specifically transmitted by *Sitobion avenae*. The reagents also cross react to a certain extent (ca. 25 %) with BYDV «B» isolates (5) transmitted non-specifically by *Rhopalosiphum padi*, *S. avenae* and some other cereal aphids (4). Stalks and young leaves are good tissue sources for the ELISA (4).

#### Information on the antibodies

Coating IgG: polyclonal; conjugate: polyclonal

### Cereal yellow dwarf virus-RPV (CYDV-RPV)

The antibodies were made against a Mexican isolate CYDV-RPV (3), efficiently transmitted by *Rhopalosiphum padi* (6). The reagents react in DAS-ELISA specifically with CYDV-RPV. Cross reactions with BYDV «Type B» and «Type F» (5) are neglectable. Stalks and young leaves are good tissue sources for the ELISA (4).

#### Information on the antibodies

Coating IgG: polyclonal; conjugate: polyclonal

## References

- (1) Clark, M.F., and Adams, A.N. 1977. J. gen. Virol. 34:475-483.
- (2) Derron, J.O., Gugerli, P., Häni, A., and Widmer, A. 1986. Rev. Suisse Agric. 18:233-237.
- (3) Gugerli, P. 1996. Plant protection report - Swiss Fed. Agric. Res. Stat. of Changins 1996, pp.27.
- (4) Gugerli, P., and Derron, J.O. 1981. Rev. Suisse Agric. 13:207-211.
- (5) Plumb, R. 1974. Ann. appl. Biol. 77:87-91.
- (6) Rochow, W.F. 1970. Descriptions of plant viruses. No. 32. CMI/AAB. 4 pp.
- (7) Rochow, W.F., and Duffus, J.E. 1981. In E. Kurstak: Handbook of Plant Virus Infections and Comparative Diagnosis. pp.147-170.
- (8) Torrance, L., Pead, M.T., Larkins, A.P., and Butcher, G.W. 1986. J. gen. Virol. 67:549-556.
- (9) Miller, W.A., Lozier, Z. 2022. Annual Review of Phytopathology, 60(1), 121-141.
- (10) Byrne, S., 2024. Irish Journal of Agricultural and Food Research, 63(1), 1-16.

## Ordering Information

**BIOREBA offers the following formats:**

**Individual ELISA reagents** for 100, 500 or 1000 assays: IgG and/or conjugate for the working volume of 200 µl/test/well.

**Reagent sets** for 480 or 960 assays: IgG and conjugate, positive and negative controls, and microtiter plates (F-96) for a working volume of 200 µl/test/well.

**Complete kits** for 96, 480 or 960 assays: All reagents, controls, microtiter plates (F-96), buffers, and substrate necessary for a working volume of 200 µl/test/well.

ELISA buffers, equipment for sample preparation and disposables are also available.

For all Art. No. please refer to our product catalogue or our homepage [www.bioreba.com](http://www.bioreba.com) and for prices and further information on any other product from BIOREBA, please contact your local distributor or our office in Switzerland.