EXPERTISE AND SERVICE PROVISION
QUALITY OF LABORATORIES

EXTERNAL QUALITY ASSESSMENT
IN VETERINARY MEDINCINE

Definitive GLOBAL REPORT

Veterinary Medicine
BVDV
SURVEY 2021/8

Sciensano/PT VET/BVD/2-E

Expertise and service provision
Quality of laboratories
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YnVa2851 Digitally signed by YnVa2851 Date: 2022.01.07 12:00:52 +01'00'

All the reports are also available on our webpage:
https://www.wiv-isp.be/QML/activities/external_quality/rapports/_nl/rapports_annee.htm
https://www.wiv-isp.be/QML/activities/external_quality/rapports/_fr/rapports_annee.htm

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INTRODUCTION

This survey was dedicated to the detection of BVDV in serum and ear notches by PCR and ELISA.

The samples were prepared by the National Reference Laboratory (NRL), Enzootic, vector-borne and bee diseases, Infectious diseases in animals Directorate, Sciensano.

Serology

Homogeneity

Nine different samples were used: PT2021BVDSERNS1, PT2021BVDSERNS3, PT2021BVDSERPS1, PT2021BVDSERPS2, PT2021BVDSERPS3, PT2021BVDSERPS4, PT2021BVDSERPS5, PT2021BVDSERPS6, PT2021BVDSERPS7. The homogeneity of the samples were tested by the NRL before the survey. The samples were considered homogeneous.

The participants

Seven laboratories participated to the IBR Virology survey: Sciensano, Arsia (Ciney), DGZ (Torhout), Lavetan, Anses, IDVET and Bio-X Diagnostics.

Target Values

The target values were determined by the NRL based on the homogeneity tests.

- PT2021BVDSERNS1 and PT2021BVDSERNS3 are considered negative.
- PT2021BVDSERPS1, PT2021BVDSERPS2, PT2021BVDSERPS3, PT2021BVDSERPS6 and PT2021BVDSERPS7 are considered positive.
- PT2021BVDSERPS4 is a dilution of positive serum to target limit of positivity with BioX assay (Monoscreen Ab ELISA BVD). For PT2021BVDSERPS4 positive results are expected with BioX and IDVet (ID-Screen BVD p80 antibody competition) kits but negative results are possible with BioX assay. This sample is considered as positive but negative results are accepted (with BioX assay).
- PT2021BVDSERPS5 is a dilution of positive serum to target limit of positivity with IDVet assay (ID-Screen BVD p80 antibody competition). For PT2021BVDSERPS5 positive results are expected with IDVet assays but NI results are possible. This sample is considered as negative with BioX assay. For PT2021BVDSERPS5, POS, NEG or NI results are accepted.

Stability

The samples were tested before and during the survey. The results were compared and the samples were considered as stable.

Randomisation and panel composition

Since a specific number has been assigned to each laboratory, the randomisation has been performed as follow:

Laboratory	97505	97507	97508	97509	97513	97522	97529
Sample ID							
BVDSER21-1	SERPS5	SERNS3	SERNS3	SERPS6	SERPS7	SERPS2	SERPS7
BVDSER21-2	SERNS1	SERPS2	SERNS1	SERPS2	SERNS1	SERPS3	SERPS5
BVDSER21-3	SERNS3	SERNS1	SERPS7	SERNS1	SERPS5	SERPS4	SERPS2
BVDSER21-4	SERPS3	SERPS4	SERPS6	SERPS3	SERPS4	SERPS6	SERPS1
BVDSER21-5	SERPS2	SERPS5	SERPS5	SERPS7	SERPS3	SERPS7	SERNS3
BVDSER21-6	SERPS4	SERPS3	SERPS2	SERNS3	SERPS2	SERPS1	SERPS4
BVDSER21-7	SERPS6	SERPS7	SERPS3	SERPS5	SERPS6	SERPS5	SERPS6
BVDSER21-8	SERPS7	SERPS6	SERPS4	SERPS4	SERNS3	SERNS3	SERNS1
BVDSER21-9	SERPS1	SERPS1	SERPS1	SERPS1	SERPS1	SERNS1	SERPS3

The panel consisted of 10 serum samples of 500 µl.

Virology

PCR: ear notch

Homogeneity

Nine different samples were used: PT2021BVDENPCRN1, PT2021BVDENPCRN2, PT2021BVDENPCRN3, PT2021BVDENPCRN4, PT2021BVDENPCRP1, PT2021BVDENPCRP2, PT2021BVDENPCRP3, PT2021BVDENPCRP4 and PT2021BVDENPCRP5. The homogeneity of the samples were tested by the NRL before the survey. The samples were considered homogeneous.

The participants

Eight laboratories participated in the BVD survey: Sciensano, Arsia (Ciney), DGZ (Torhout), LNCR/ACSEDIATE, Anses, LMVE, IDVET and LSZ-Thermofisher Scientific.

Target Values

The target values were determined by the NRL based on the homogeneity tests.

- PT2021BVDENPCRN1, PT2021BVDENPCRN2, PT2021BVDENPCRN3 and PT2021BVDENPCRN4 are considered negative.
- PT2021BVDENPCRP1, PT2021BVDENPCRP2, PT2021BVDENPCRP3, PT2021BVDENPCRP4 and PT2021BVDENPCRP5 are considered positive.

Stability

The samples were tested before and during the survey. The results were compared and the samples were considered as stable.

Randomisation and panel composition

Since a specific number has been assigned to each laboratory, the randomisation has been performed as follow:

Laboratory	97505	97507	97508	97510	97513	97516	97522	97534
Sample ID								
BVDENPCR21-1	PCRN4	PCRN2	PCRN1	PCRN2	PCRN1	PCRP3	PCRN1	PCRP2
BVDENPCR21-2	PCRP5	PCRP3	PCRP5	PCRP4	PCRP2	PCRP5	PCRN3	PCRN1
BVDENPCR21-3	PCRN1	PCRP1	PCRP4	PCRN1	PCRN3	PCRN2	PCRP5	PCRP4
BVDENPCR21-4	PCRN2	PCRP5	PCRP1	PCRP2	PCRN4	PCRN4	PCRN2	PCRN3
BVDENPCR21-5	PCRP1	PCRP2	PCRP2	PCRP5	PCRN1	PCRP1	PCRN1	PCRP5
BVDENPCR21-6	PCRP4	PCRP4	PCRN1	PCRN4	PCRP5	PCRN1	PCRN4	PCRP1
BVDENPCR21-7	PCRN1	PCRN1	PCRN4	PCRP1	PCRN2	PCRP4	PCRP4	PCRP3
BVDENPCR21-8	PCRP2	PCRN1	PCRN3	PCRN1	PCRP3	PCRN3	PCRP2	PCRN1
BVDENPCR21-9	PCRN3	PCRN4	PCRN2	PCRP3	PCRP1	PCRN1	PCRP3	PCRN2
BVDENPCR21-10	PCRP3	PCRN3	PCRP3	PCRN3	PCRP4	PCRP2	PCRP1	PCRN4

The panel consisted of 10 tissue samples.

ELISA: ear notch

Homogeneity

Nine different samples were used: PT2021BVDENELISAN1, PT2021BVDENELISAN2, PT2021BVDENELISAN3, PT2021BVDENELISAN4, PT2021BVDENELISAP1, PT2021BVDENELISAP2, PT2021BVDENELISAP3, PT2021BVDENELISAP4 and PT2021BVDENELISAP5. The homogeneity of the samples were tested by the NRL before the survey. The samples were considered homogeneous.

The participants

Five laboratories participated in the BVD survey: Sciensano, Arsia (Ciney), DGZ (Torhout), Lavetan and Anses.

Target Values

The target values were determined by the NRL based on the homogeneity tests.

- PT2021BVDENELISAN1, PT2021BVDENELISAN2, PT2021BVDENELISAN3 and PT2021BVDENELISAN4 are considered negative.
- PT2021BVDENELISAP1, PT2021BVDENELISAP2, PT2021BVDENELISAP3, PT2021BVDENELISAP4 and PT2021BVDENELISAP5 are considered positive.

Stability

The samples were tested before and during the survey. The results were compared and the samples were considered as stable.

Randomisation and panel composition

Since a specific number has been assigned to each laboratory, the randomisation has been performed as follow:

Laboratory	97505	97507	97508	97509	97513
Sample ID					
BVDENELISA21-1	ELISAN1	ELISAP1	ELISAN2	ELISAP3	ELISAN3
BVDENELISA21-2	ELISAN4	ELISAN4	ELISAP3	ELISAN2	ELISAN2
BVDENELISA21-3	ELISAP1	ELISAN1	ELISAN3	ELISAN3	ELISAP1
BVDENELISA21-4	ELISAP3	ELISAP4	ELISAP4	ELISAP2	ELISAP3
BVDENELISA21-5	ELISAN1	ELISAN2	ELISAP2	ELISAN1	ELISAP2
BVDENELISA21-6	ELISAP2	ELISAP3	ELISAN1	ELISAN1	ELISAP4
BVDENELISA21-7	ELISAN2	ELISAN1	ELISAP5	ELISAP4	ELISAN4
BVDENELISA21-8	ELISAN3	ELISAP5	ELISAP1	ELISAN4	ELISAN1
BVDENELISA21-9	ELISAP4	ELISAP2	ELISAN1	ELISAP1	ELISAN1
BVDENELISA21-10	ELISAP5	ELISAN3	ELISAN4	ELISAP5	ELISAP5

The panel consisted of 10 tissue samples.

Survey timeline

Transfer of the samples from NRL to QL: 2/6/2021
Randomization of the samples by QL: 3/6/2021
Sending samples (on dry ice) to participants: 7/6/2021
Deadline for the results encoding: 30/06/2021
Preliminary report: 19/08/2021

RESULTS

Serology

The panel consisted of 9 samples: 2 negative, 2 doubtful and 5 positive samples.
6 laboratories encoded results. 5 laboratories encoded one dataset and 1 laboratory encoded 2 datasets.

Results per sample

Table 1: Results per sample.

Sample ID	Status	Number of repetitions (total results)	Observed result
SERNS1	NEG	1 (7)	7 NEG
SERNS3	NEG	1 (7)	7 NEG
SERPS1	POS	1 (7)	7 POS
SERPS2	POS	1 (7)	7 POS
SERPS3	POS	1 (7)	6 POS 1 ND
SERPS4	POS/NI/NEG	1 (7)	6 POS 1 ND
SERPS5	POS/NI/NEG	1 (7)	4 NEG 2 NI 1 POS
SERPS6	POS	1 (7)	7 POS
SERPS7	POS	1 (7)	7 POS

Two laboratories were unable to analyse one sample due to fact that the sample was no longer liquid, resulting in a crystallized mass. Globally, on 63 encoded results, 61/63 (96.8%) were correct.

Used methods

Table 2: Results per method (NR = number of results; NCR = number of correct results).

Method	N	NR	NCR	%
ID.VET: Idscreen BVD p80 antibody competition	3	27	27	100
Bio-X Diagnostics: Monoscreen Ab ELISA BVD	3	27	26	96.3
Bio-X Diagnostics: Other	1	9	8	89
TOTAL	7	63	61	96.8

Conclusion

The participants obtained an 96.8% of success in this survey. Out of the 6 laboratories, 4 encoded 100% of correct results (9/9). Two laboratories encoded 8 correct results and one Not determined result due to a technical problem.

Virology

The panel consisted of 9 different samples, sample PCRN1 was repeated twice. Therefore, the panel consisted of 10 samples: 5 positive and 5 negative.

PCR: ear notch

Results per sample

Table 3: Results per sample.

Sample ID	Status	Number of repetitions (total results)	Observed result
PCRN1	NEG	2 (16)	16 NEG
PCRN2	NEG	1 (8)	8 NEG
PCRN3	NEG	1 (8)	8 NEG
PCRN4	NEG	1 (8)	8 NEG
PCRP1	POS	1 (8)	8 POS
PCRP2	POS	1 (8)	8 POS
PCRP3	POS	1 (8)	8 POS
PCRP4	POS	1 (8)	8 POS
PCRP5	POS	1 (8)	8 POS

Globally, on 80 encoded results, 80/80 (100%) were correct.

Used methods

Table 4: Results per method (NR = number of results; NCR = number of correct results).

Method	N	NR	NCR	%
Home made	1	10	10	100
Thermofisher: LSIVETMAX BVD4ALL	3	30	30	100
Indical (Qiagen): BVD RT-PCR kit	1	10	10	100
BioX-Adiagene: Adiavet BVD RealTime	1	10	10	100
IDVET: ID GENE BVD/BD TRIPLEX	1	10	10	100
Other	1	10	10	100
TOTAL	8	80	80	100

Extraction method

Table 5: Extraction methods.

Method	N
Qiagen: RNeasy Mini Kit	1
Indical: IndiMag Pathogen Kit	1
IDVET: Direct Lysis Buffer	1
ThermoFisher Scientific: VetMAX BVDV Screening kit	1
BioX-Adiagene: Adiavet BVD RealTime	1
ThermoFisher Scientific: Mag Max Core	2
IDVET: ID Gene Mag Universal Extraction kit	1
TOTAL	8

Conclusion

The participants obtained an 100% of success in this survey.

ELISA: ear notch

The panel consisted of 9 different samples, sample ELISAN1 was repeated twice. Therefore, the panel consisted of 10 samples: 5 positive and 5 negative.

Results per sample

Table 6: Results per sample.

Sample ID	Status	Number of repetitions (total results)	Observed result
ELISAN1	NEG	2 (10)	10 NEG
ELISAN2	NEG	1 (5)	5 NEG
ELISAN3	NEG	1 (5)	5 NEG
ELISAN4	NEG	1 (5)	5 NEG
ELISAP1	POS	1 (5)	5 POS
ELISAP2	POS	1 (5)	5 POS
ELISAP3	POS	1 (5)	5 POS
ELISAP4	POS	1 (5)	5 POS
ELISAP5	POS	1 (5)	5 POS

Globally, on 50 encoded results, 50/50 (100%) were correct

Used methods

All the participants used the IDEXX BVDV Ag/Serum Plus Test kit.

Conclusion

The participants obtained an 100% of success in this survey.

ANNEXES (NOT UNDER ACCREDITATION)

The boxplots were performed using the shiny.chemgrid.org/boxplotr/ software

Annex 1: Quantitative data

ELISA: ear notch

Sample PT2021BVDENELISAN1

Table A1. Quantitative values.

Lab ID	97505	97507	97508	97509	97513
Method	IDEXX BVDV Ag/Serum Plus Test kit				
REP1	1.245	-0.014	0.026	0.033	0.088
REP2	0.752	-0.017	0.030	0.034	0.090
Mean	0.999	-0.016	0.028	0.034	0.089
SD	0.349	0.002	0.003	0.001	0.001
CV (%)	34.9	-13.7	10.3	2.1	1.6

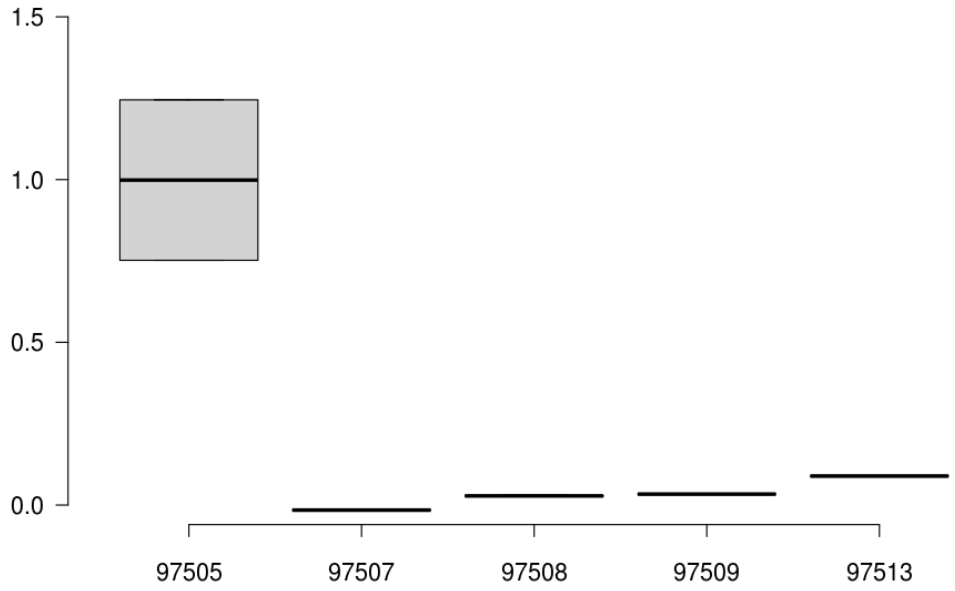


Figure A1. Distribution of the normalized values (box-plots) per laboratory.

Annex 2: additional information

Preliminary report

The preliminary report of this survey is available on our website via the following link: https://www.wiv-isp.be/QML/activities/PT%20VET/fr/originaux/rapports_annee.htm

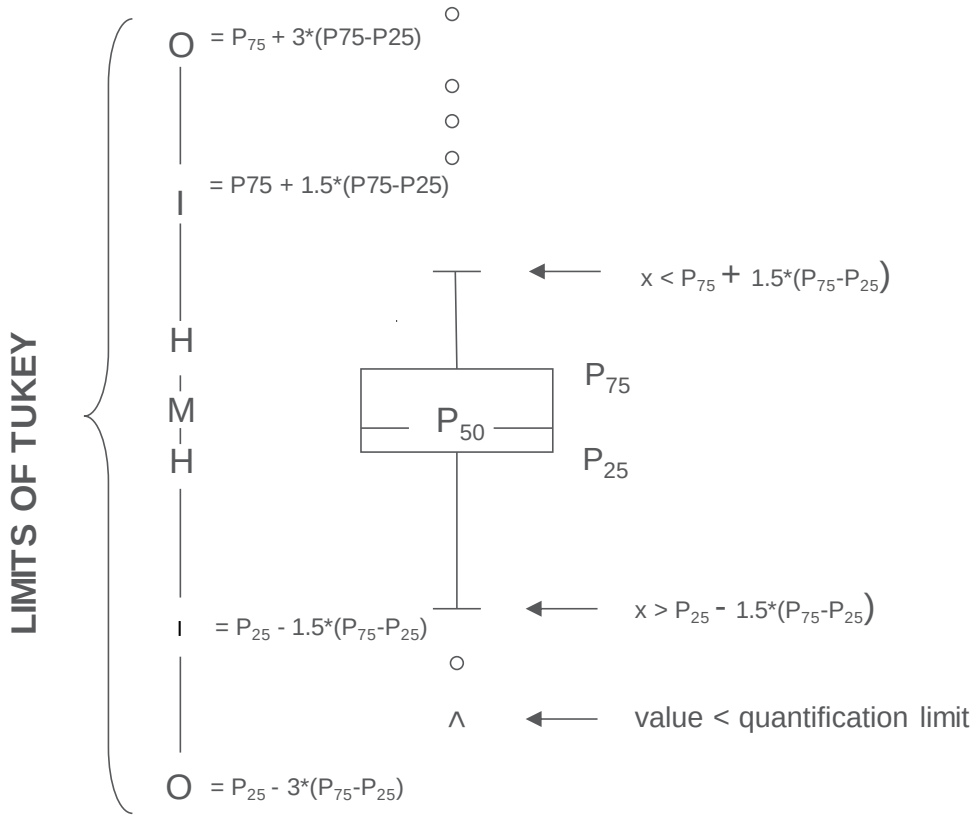
The calendar for Proficiency Testing in Veterinary diagnosis is available on our website:

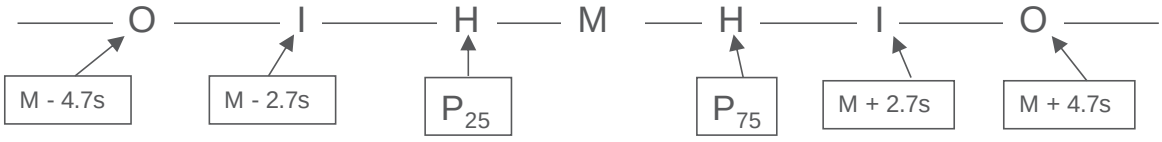
The link is:
https://www.wivisp.be/QML/activities/external_quality/calendar/calender_PT%20VET/_fr/Calendrier_2020-PT%20VET%202.htm

Graphical representation

Besides the tables with the results a "Box and whisker" plot is added. It contains the following elements for the methods with at least 6 participants:

- a rectangle ranging from percentile 25 (**P_{25}**) to percentile 75 (**P_{75}**)
- a central line representing the median of the results (**P_{50}**)
- a lower limit showing the smallest value **$x > P_{25} - 1.5 * (P_{75} - P_{25})$**
- an upper limit representing the largest value **$x < P_{75} + 1.5 * (P_{75} - P_{25})$**
- all points outside this interval are represented by a dot.





Corresponding limits in case of normal distribution

END