Análisis SARS-CoV-2 en Aguas Residuales

Viruses in human feces

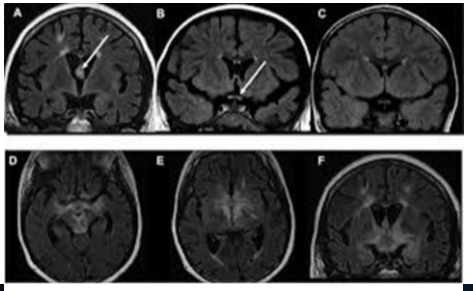
Neurotropic
Enterovirus
Poliovirus
Parechovirus
Nipah virus
TBE

Hepatotropic
Hepatitis A
Hepatitis E

Enterotropic
Norovirus
Sapovirus
Rotavirus
Astrovirus
Adenovirus
Aichivirus

Pneumotropic
Influenza
SARS CoV-1
SARS-CoV-2
MERS-CoV

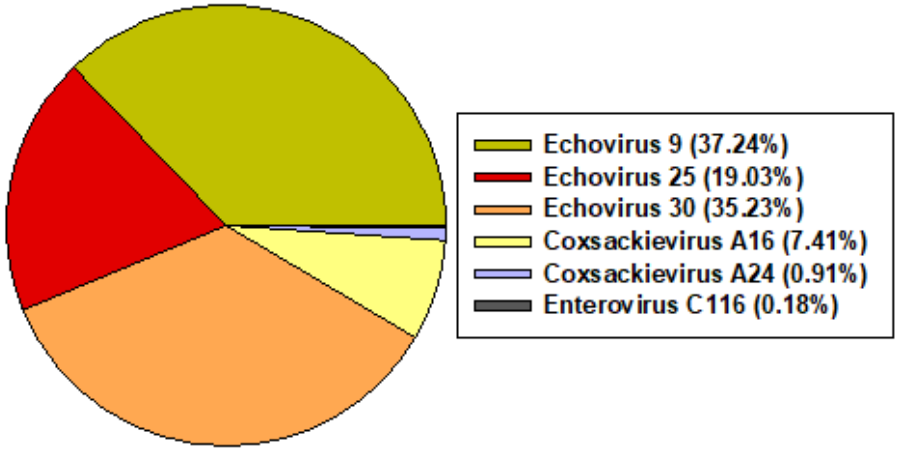
Multitropic
Ebola



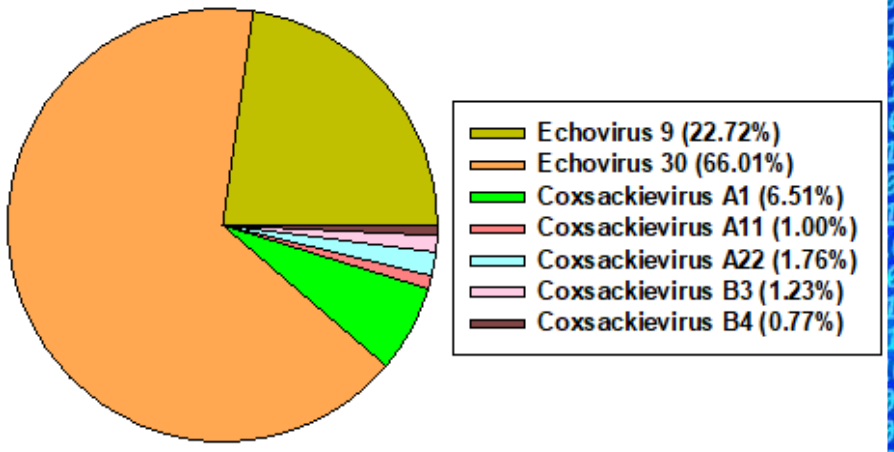
Rhombencephalitis

Enteroviruses in Barcelona Raw Sewage

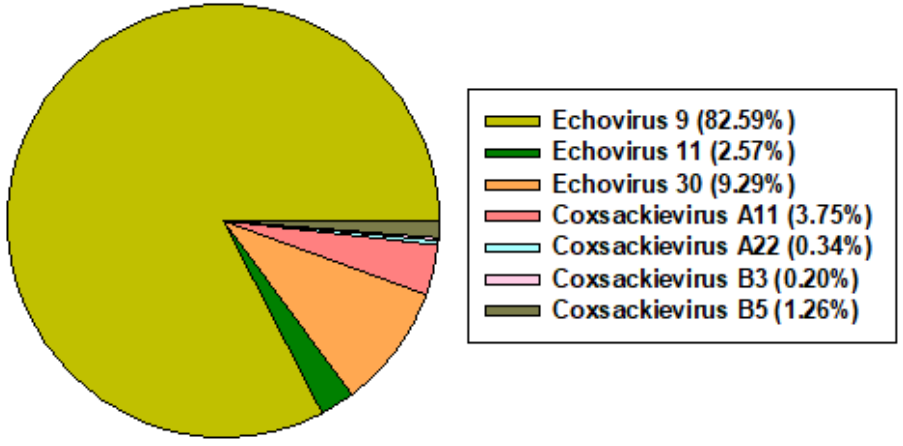
May 2018



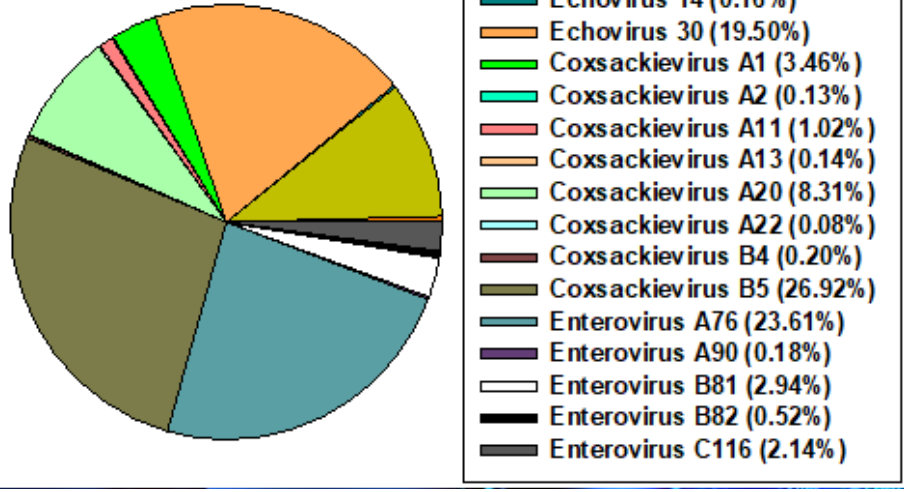
June 2018



July 2018



August 2018



EL CORONAVIRUS SARS-CoV-2 Y LA PANDEMIA DE COVID-19

Sociedad Española de Virología (SEV)

25/4/2020

25

Manejo clínico del paciente de COVID-19

- La mayor parte de los pacientes (80-85%) tienen una enfermedad leve y sin complicaciones *[ver Ficha #InfoSEV nº 8]*
- Algunos (15-20%) desarrollan cuadros clínicos mas graves, que requieren hospitalización y oxigenoterapia.
- Aproximadamente un 5% del total de infectados requieren ingreso en la unidad de cuidados intensivos (UCI).
- En el punto de urgencias: valoración inmediata del riesgo de cada paciente; aislamiento y uso de mascarilla por el paciente; personal sanitario con equipo de protección adecuado.

Cuadro clínico	Síntomas	Medidas
Síntomas leves	Fiebre	Antipiréticos, hidratación
	Dolor de cabeza	Paracetamol
	Fatiga, dolor muscular	Reposo
	Diarrea, anorexia, vómitos	Tto. sintomático, vigilancia
Neumonía severa	Respiración rápida, letargia, saturación O_2 baja	Ingreso en hospital, oxigenoterapia, antivirales, anti-inflamatorios
	Co-infecciones	Antibioterapia específica
	Síntomas neurológicos	Prevención complicaciones, Inmunosupresores
	Dificultad respiratoria	Ventilación en pronación
Síndrome de distress respiratorio	Dificultad respiratoria severa	UCI: Intubación, ventilación mecánica
Sepsis	Problemas de coagulación, síntomas neurológicos, alteraciones urinarias	Heparina, tto. específico
Shock séptico	Hipotensión, taquicardia, taquipnea	Tto. específico

- Para saber más: https://www.who.int/docs/default-source/coronaviruse/clinical-management-of-novel-cov.pdf

https://www.mscbs.gob.es/ https://www.isciii.es/
http://sevirologia.es/

@sanidadgob @CIBER_ISCIII
@sev_virologia

Science

RESEARCH ARTICLES

Cite as: M. M. Lamers *et al.*,
Science 10.1126/science.abc1669 (2020).

SARS-CoV-2 productively infects human gut enterocytes

Mart M. Lamers[1]*, Joep Beumer[2]*, Jelte van der Vaart[2]*, Kèvin Knoops[3], Jens Puschhof[2], Tim I. Breugem[1], Raimond B. G. Ravelli[3], J. Paul van Schayck[3], Anna Z. Mykytyn[1], Hans Q. Duimel[3], Elly van Donselaar[3], Samra Riesebosch[1], Helma J. H. Kuijpers[3], Debby Schippers[1], Willine J. van de Wetering[3], Miranda de Graaf[1], Marion Koopmans[1], Edwin Cuppen[4,5], Peter J. Peters[3], Bart L. Haagmans[1]†, Hans Clevers[2]†‡

Christian Drosten (La Charité, Berlin):
The proportion of infectious SARS-CoV-2 in respiratory secretions is very low (around 1 infectious unit in 10^7 physical particles) and ***even less in feces***

Science Immunology

RESEARCH ARTICLE

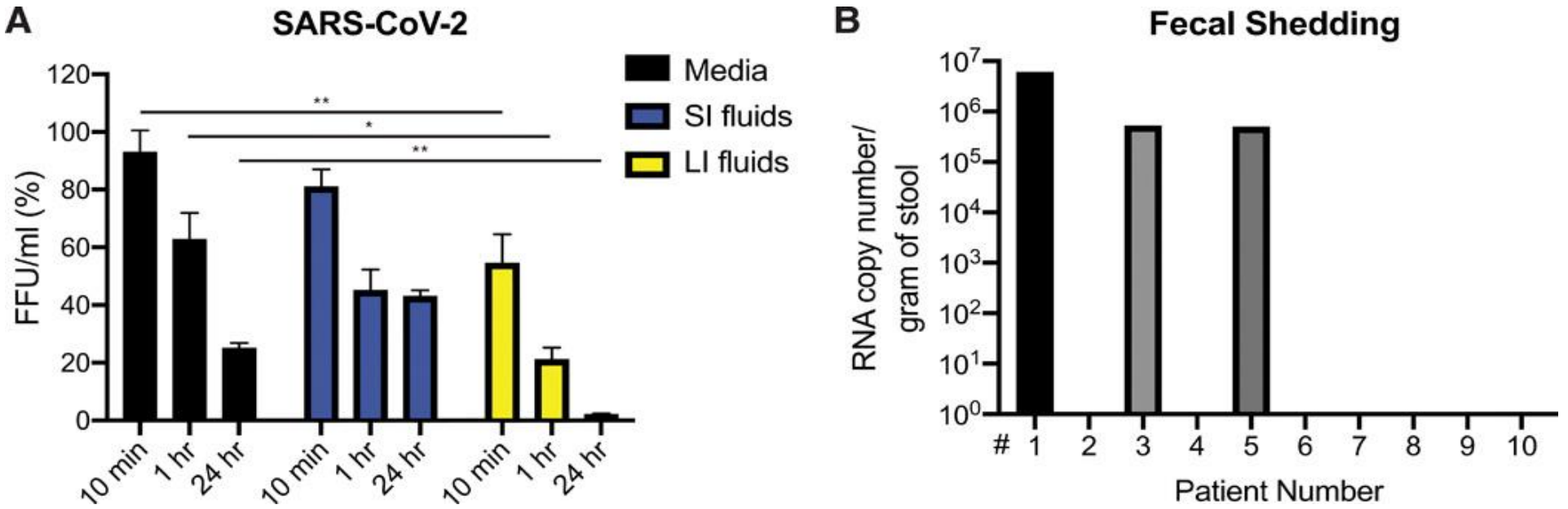
Cite as: R. Zang *et al.*, *Sci. Immunol.* 10.1126/sciimmunol.abc3582 (2020).

CORONAVIRUS

TMPRSS2 and TMPRSS4 promote SARS-CoV-2 infection of human small intestinal enterocytes

Ruochen Zang[1,2,*], Maria Florencia Gomez Castro[1,*], Broc T. McCune[3], Qiru Zeng[1], Paul W. Rothlauf[1,4], Naomi M. Sonnek[5], Zhuoming Liu[1], Kevin F. Brulois[6,7], Xin Wang[2], Harry B. Greenberg[7,8], Michael S. Diamond[1,3,9], Matthew A. Ciorba[5], Sean P. J. Whelan[1], Siyuan Ding[1†]

SARS-CoV-2 rapidly lose infectivity in the human GI tract.



EMERGING INFECTIOUS DISEASES®

EID Journal > Volume 26 > Early Release > Main Article

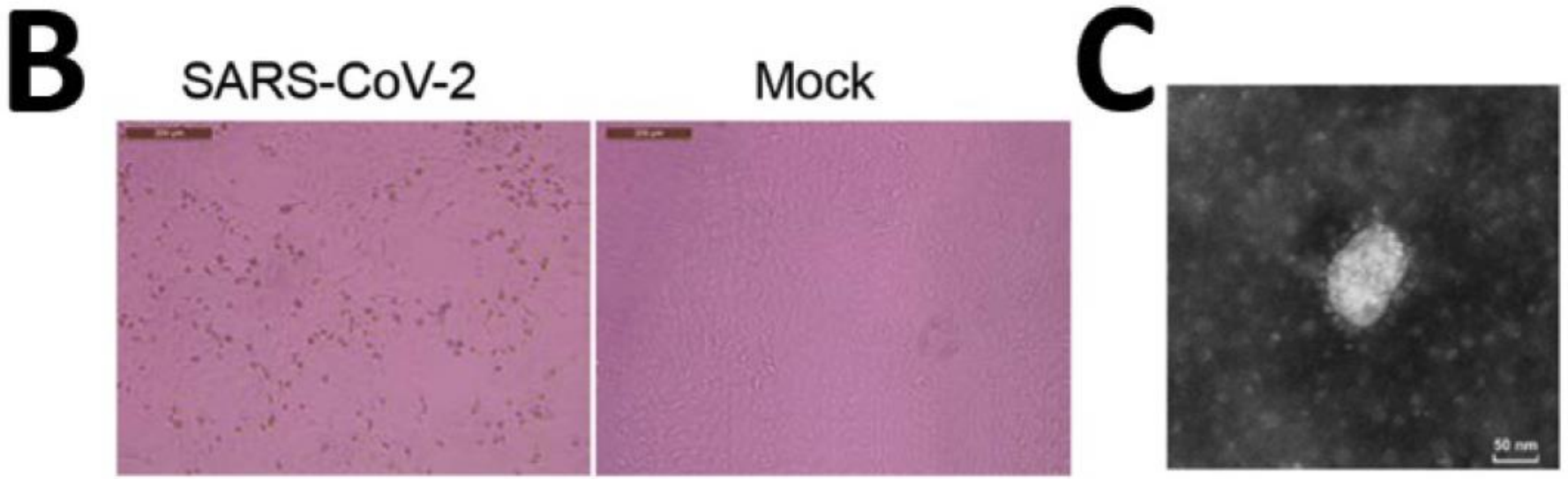
Volume 26, Number 8—August 2020

Research Letter

Infectious SARS-CoV-2 in Feces of Patient with Severe COVID-19

Fei Xiao[1], Jing Sun[1], Yonghao Xu[1], Fang Li[1], Xiaofang Huang[1], Heying Li, Jingxian Zhao, Jicheng Huang, and Jincun Zhao✉

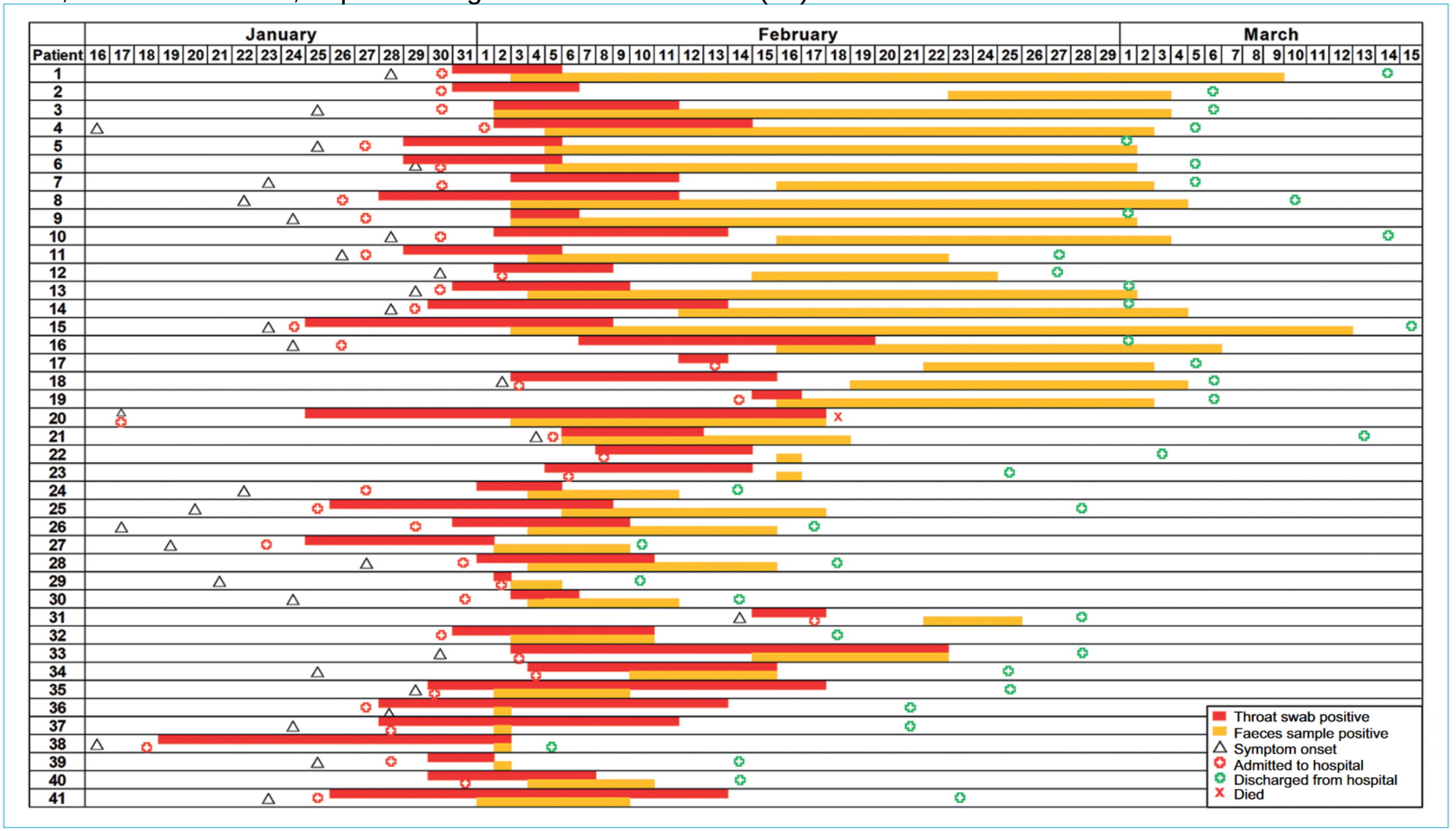
Author affiliations: Sun Yat-sen University, Zhuhai, China (F. Xiao); Guangzhou Medical University, Guangzhou, China (J. Sun, Y. Xu, F. Li, X. Huang, Jingxian Zhao, Jincun Zhao); Chinese Academy of Sciences, Guangzhou (H. Li); Guangzhou Customs District Technology Center, Guangzhou (J. Huang)



B) Vero E6 cells infected with SARS-CoV-2 isolate for 72 hours. C) Detection of viral particles by using transmission electron microscopy (original magnification, ×98,000).

Prolonged Presence of SARS-CoV-2 Viral RNA in Faecal Samples

Wu et al., 2020 The Lancet, https://doi.org/10.1016/S2468-1253(20)30083-2



Timeline of results from throat swabs and faecal samples through the course of disease

- Medema G, Heijnen L, Elsinga G, Italiaander R, Brouwer A. Presence of SARS-Coronavirus-2 in sewage. *medRxiv*. 2020.03.29.20045880

- Lodder W, de Roda Husman AM. SARS-CoV-2 in wastewater: potential health risk, but also data source. *The Lancet Gastroenterology & Hepatology*. 2020;5(6):533-4.

Water Research 181 (2020) 115942

Contents lists available at ScienceDirect

Water Research

journal homepage: www.elsevier.com/locate/watres

SARS-CoV-2 RNA in wastewater anticipated COVID-19 occurrence in a low prevalence area

Walter Randazzo [a, b], Pilar Truchado [c], Enric Cuevas-Ferrando [b], Pedro Simón [d], Ana Allende [c], Gloria Sánchez [b, *]

[a] Department of Microbiology and Ecology, University of Valencia, Av. Dr. Moliner, 50, Burjassot, 46100, Valencia, Spain
[b] Department of Preservation and Food Safety Technologies, Institute of Agrochemistry and Food Technology, IATA-CSIC, Av. Agustín Escardino 7, Paterna, 46980, Valencia, Spain
[c] Research Group on Quality, Safety and Bioactivity of Plant Foods, Department of Food Science and Technology, CEBAS-CSIC, Campus Universitario de Espinardo, 25, 30100, Murcia, Spain
[d] ESAMUR, Avenida Juan Carlos, s/n - Edificio Torre Jemeca, Murcia, Spain

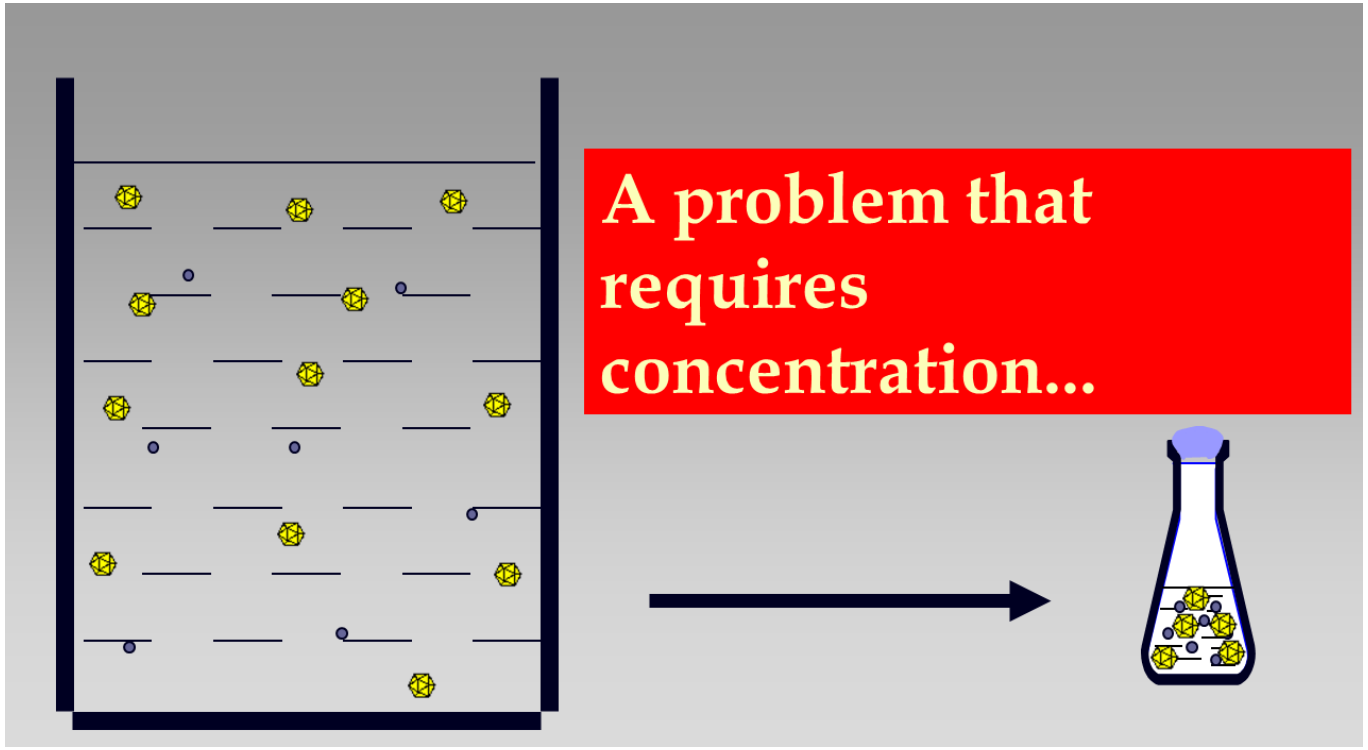
Sentinel surveillance of SARS-CoV-2 in wastewater anticipates the occurrence of COVID-19 cases

Gemma Chavarria-Miró, Eduard Anfruns-Estrada, Susana Guix, Miquel Paraira, Belén Galofré, Gloria Sáanchez, Rosa Pintó, Albert Bosch

doi: https://doi.org/10.1101/2020.06.13.20129627

medRxiv
THE PREPRINT SERVER FOR HEALTH SCIENCES

Virus detection in the water environment:



Food and Environmental Virology (2019) 11:184–192
https://doi.org/10.1007/s12560-019-09378-0

ORIGINAL PAPER

Check for updates

Glass Wool Concentration Optimization for the Detection of Enveloped and Non-enveloped Waterborne Viruses

Albert Blanco[1,2] · Islem Abid[3] · Nawal Al-Otaibi[3] · Francisco José Pérez-Rodríguez[1,2] · Cristina Fuentes[1,2] · Susana Guix[1,2] · Rosa M. Pintó[1,2] · Albert Bosch[1,2]

SAVCA
Servicio de Análisis de Virus en la Cadena Alimentaria
Campus de la Alimentación de Torribera
Avda. Prat de la Riba 171
08921. Santa Coloma de Gramanet. Barcelona
Tel: 934020522

VIRUS ENTÈRICS
UNIVERSITAT DE BARCELONA
www.ub.edu/virusenterics

PROTOCOLO DETECCIÓN SARS-CoV-2 EN AGUA RESIDUAL

REACTIVOS

- Tiras reactivas de pH
- Tampón TGEB pH 9.5 (100 mM Tris –HCl, Glicina 0.05M, Extracto de carne 1%)
- PEG 6000
- NaCl
- NaOH 5M
- HCl 5M
- PBS pH 7.4
- Kit de extracción de RNA (NucliSENS® miniMAG® extraction system, BioMérieux)
- RNA UltraSense™ One-Step Quantitative RT-PCR System, Invitrogen)
- Virus control de proceso: Tansmissible Gastroenteritis Enteric Virus (TGEV) [1]
- Twist Synthetic SARS-CoV-2 RNA Control 2 (MN908947.3) (Twist Bioscience)

MINISTERIO DE ECONOMÍA, INDUSTRIA Y COMPETITIVIDAD

CSIC
CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

PROTOCOLO

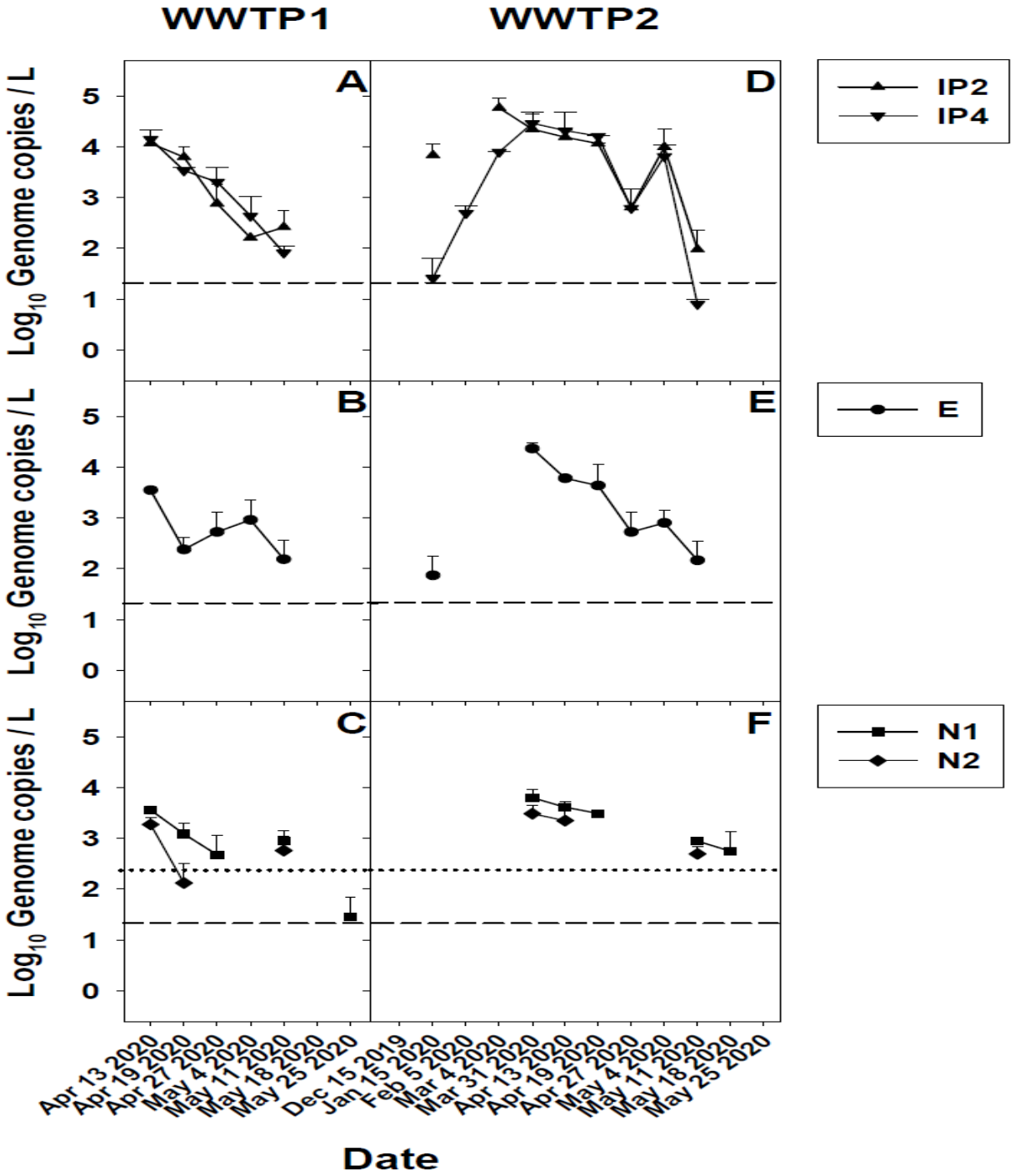
DETECCIÓN DE SARS-CoV-2 EN AGUAS RESIDUALES

(Versión 1.4, Junio 2020)

ENVÍO DE LAS MUESTRAS

- El envío de las muestras de aguas desde la EDAR hasta los laboratorios de análisis se debe de realizar mediante transporte refrigerado.
- Las botellas de las muestras de agua se deben introducir en cajas herméticas que impidan el derrame en caso de rotura. Dentro de las cajas se debe introducir algún material absorbente que evite derrames en caso de rotura.

- **EDAR Besòs: 3 M inhabitant equivalents**
- **EDAR El Prat de Llobregat: 2 M inhabitant equivalents**



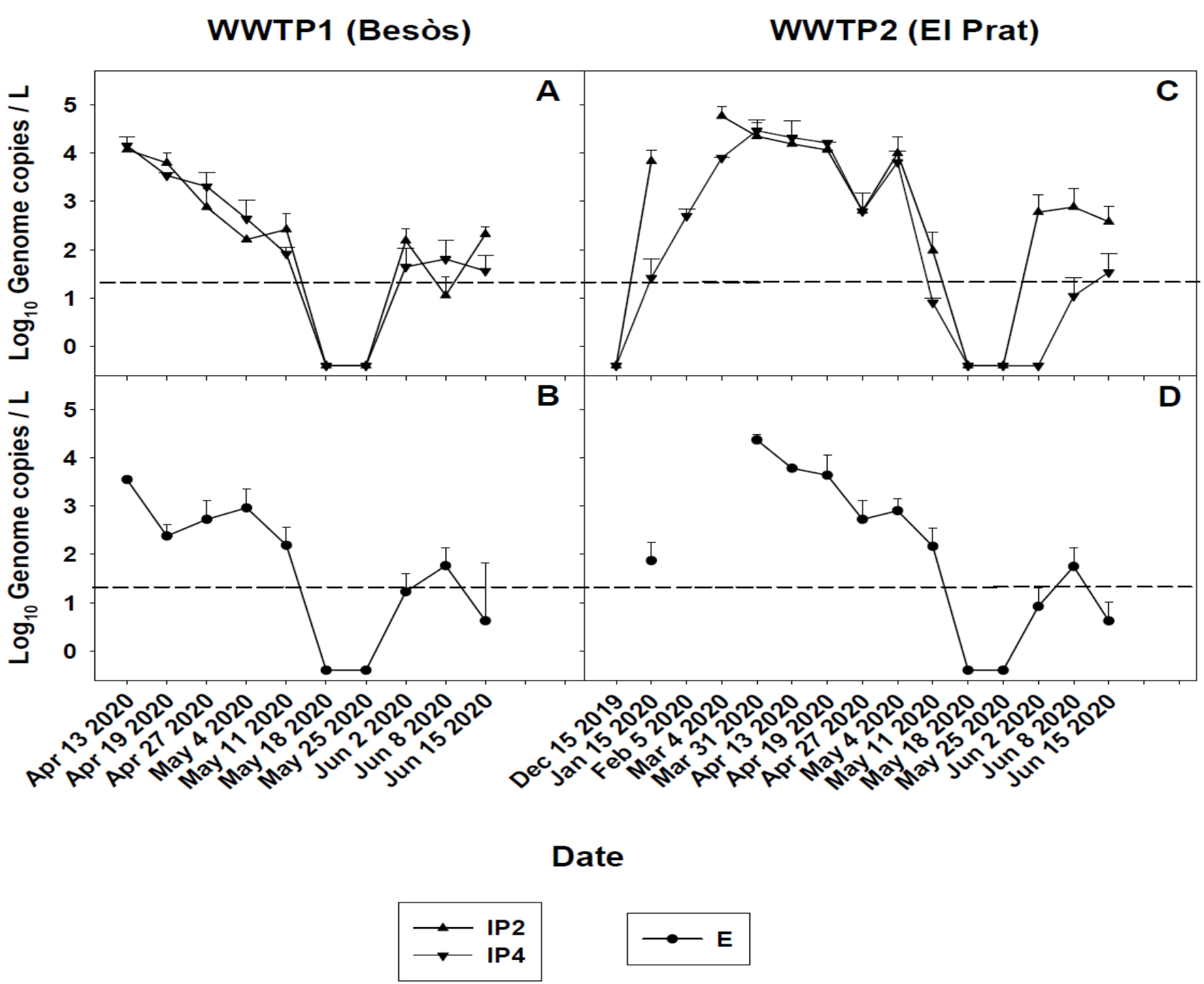
Primer regions:

RdRp: **IP2**, **IP4**, Institut Pasteur

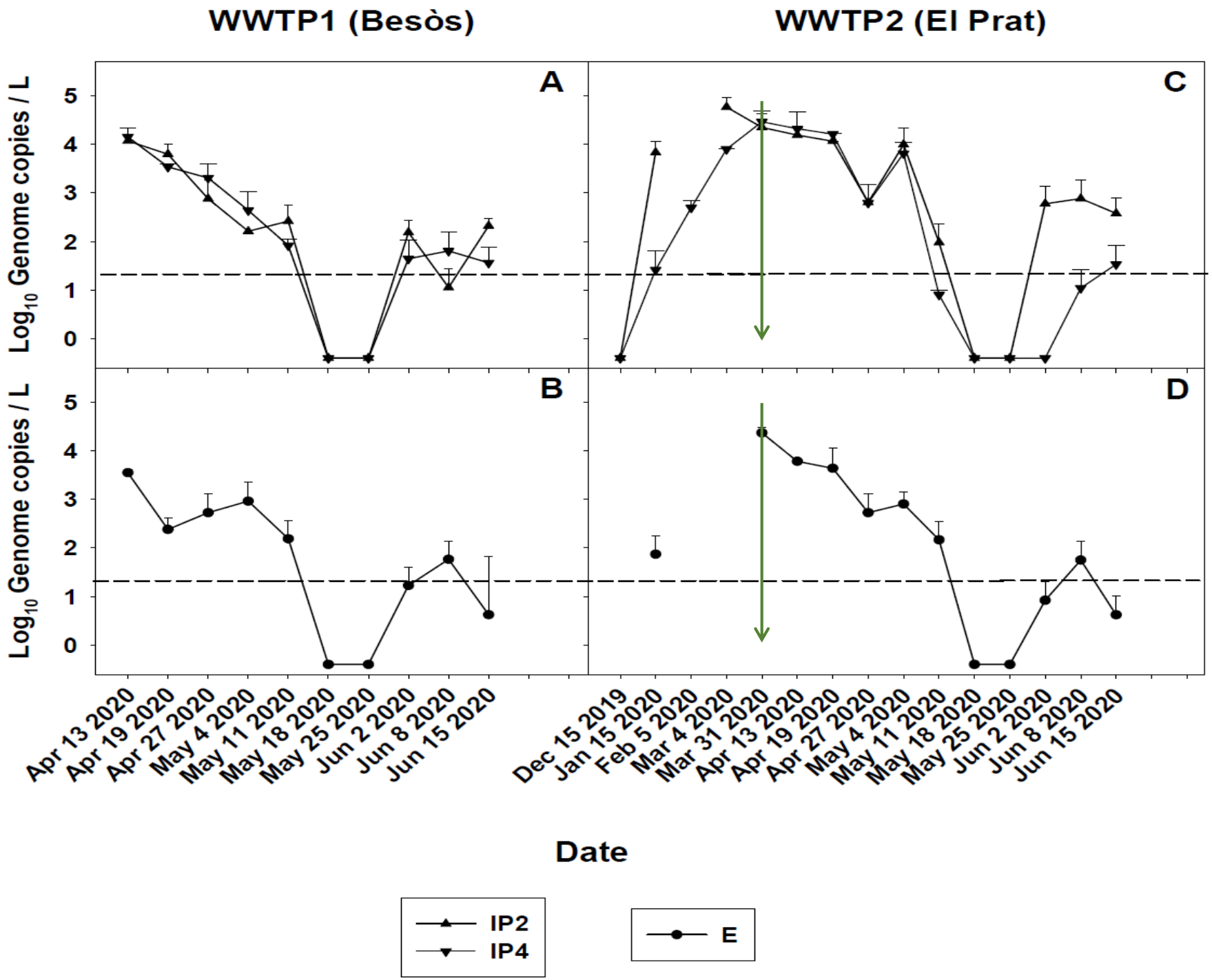
Envelope protein: **E**, Charité Berlin

Nucleoprotein: **N1**, **N2**, CDC

VIRUS ENTÈRICS

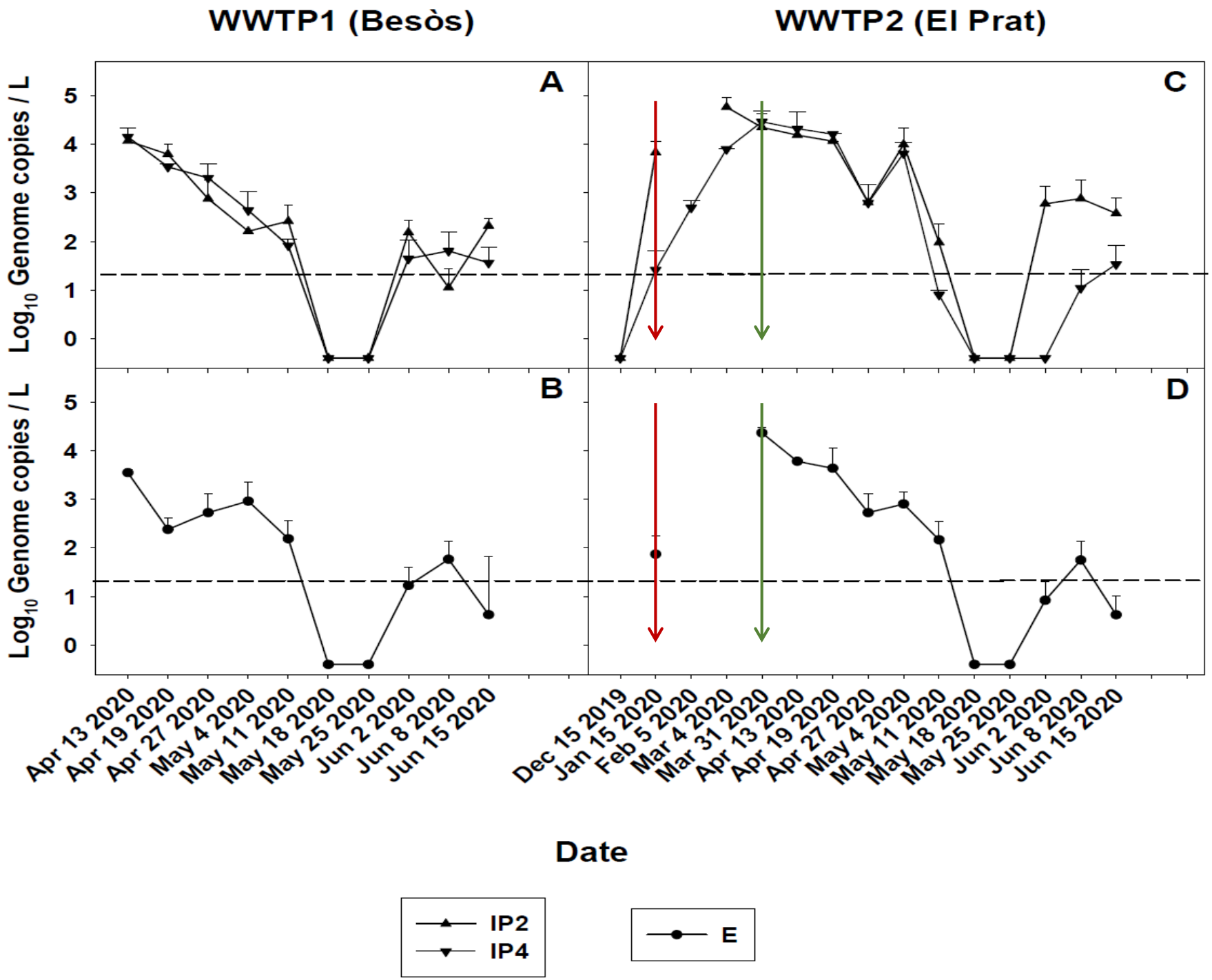


VIRUS ENTÈRICS



Primer muestreo: 31 de marzo

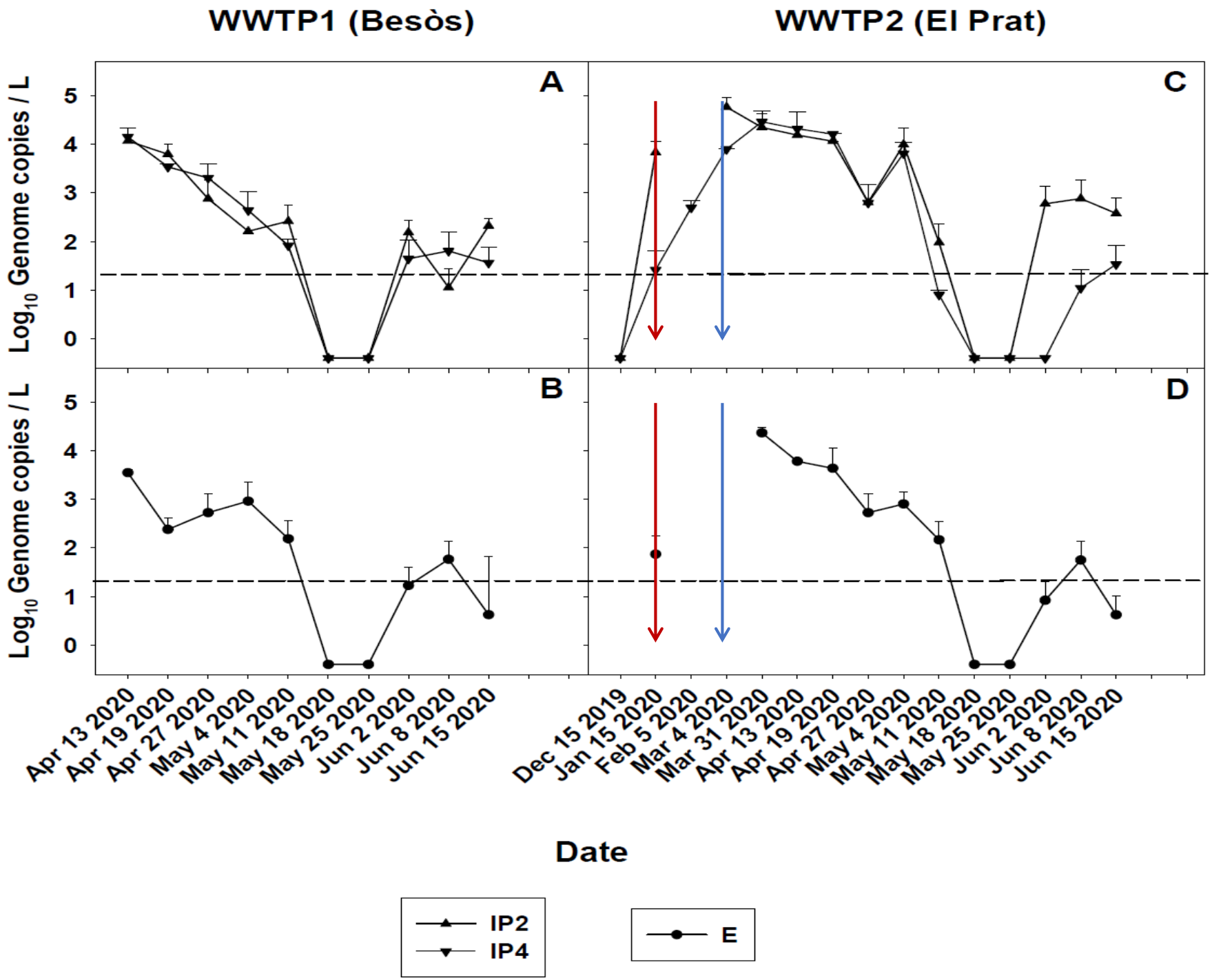
VIRUS ENTÈRICS



Primer muestreo: 31 de marzo

Primer positivo: 15 de enero

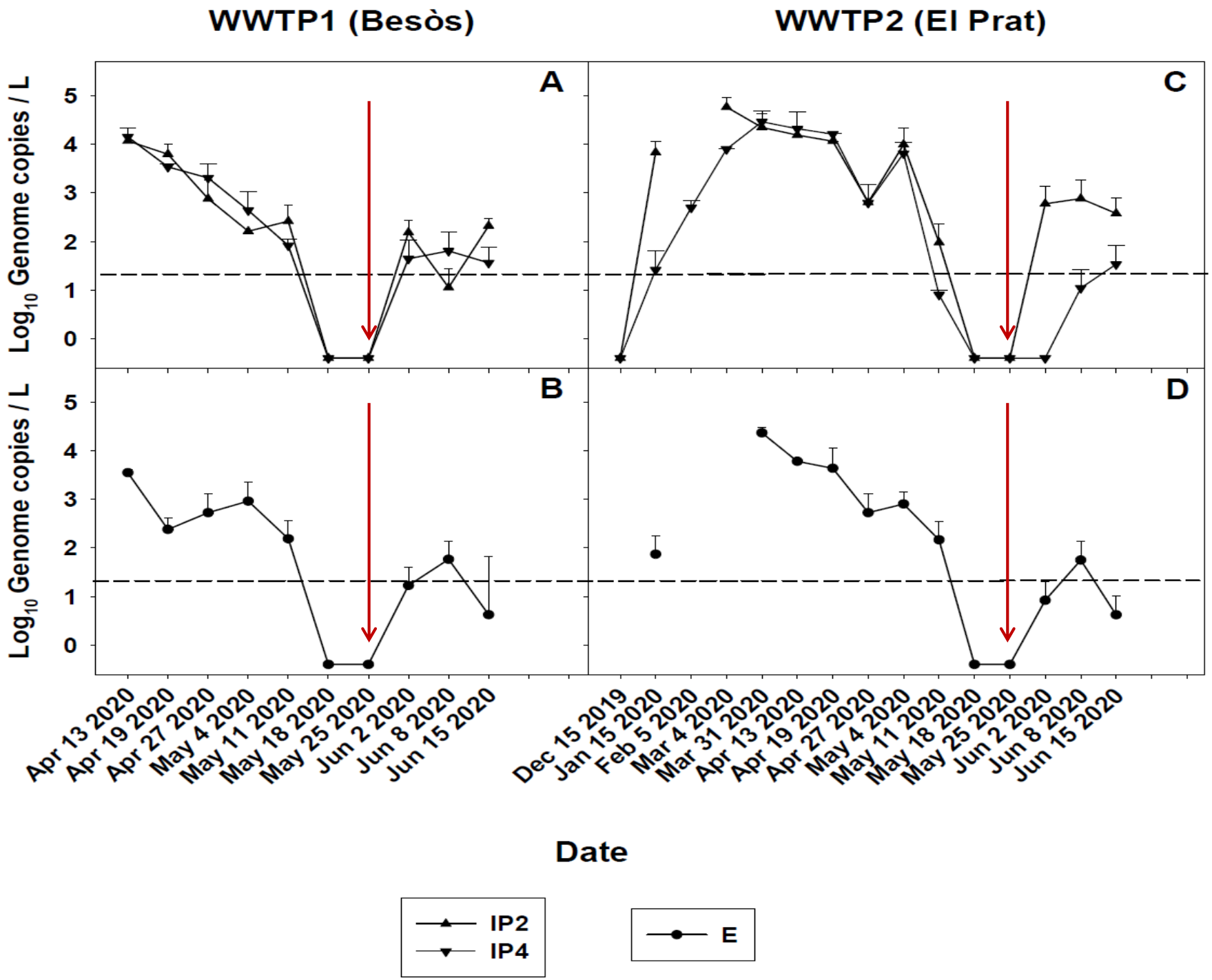
VIRUS ENTÈRICS



Primer positivo: 15 de enero

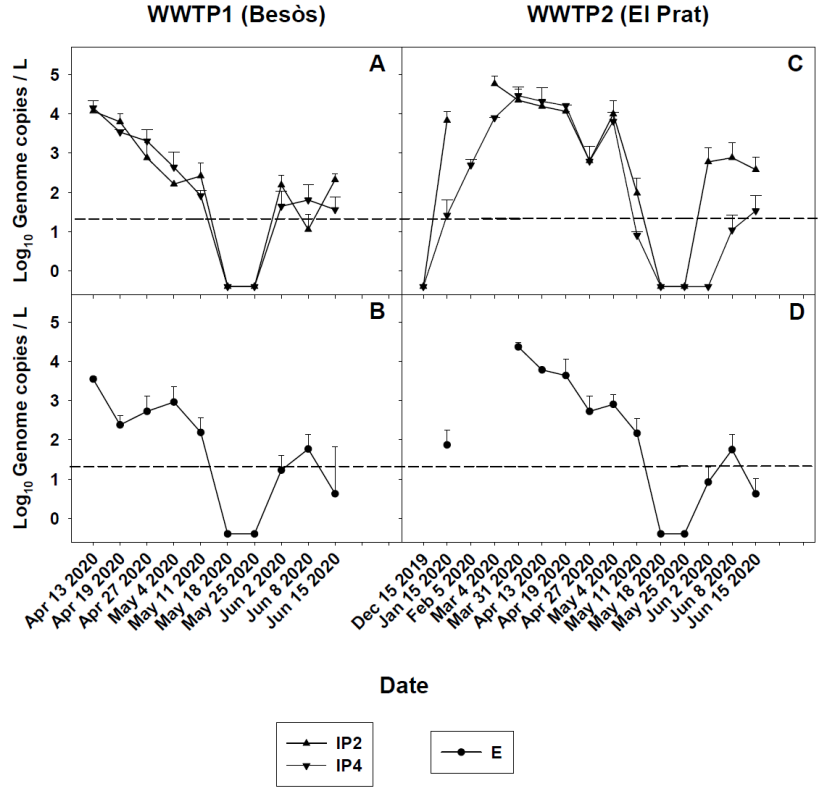
Primer caso COVID-19 confirmado: 25 de febrero

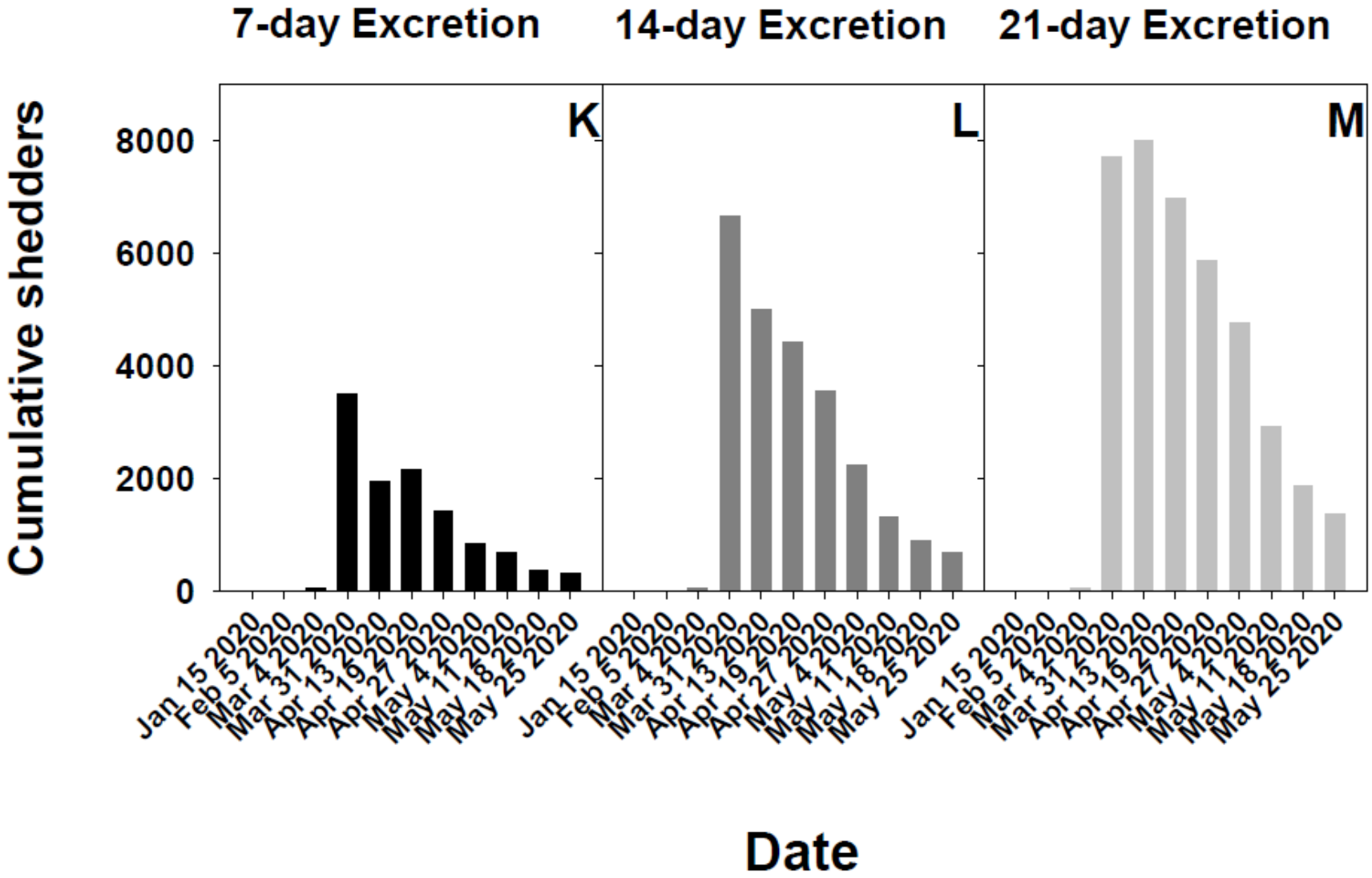
VIRUS ENTÈRICS



Entrada Fase 1: 25 de Mayo

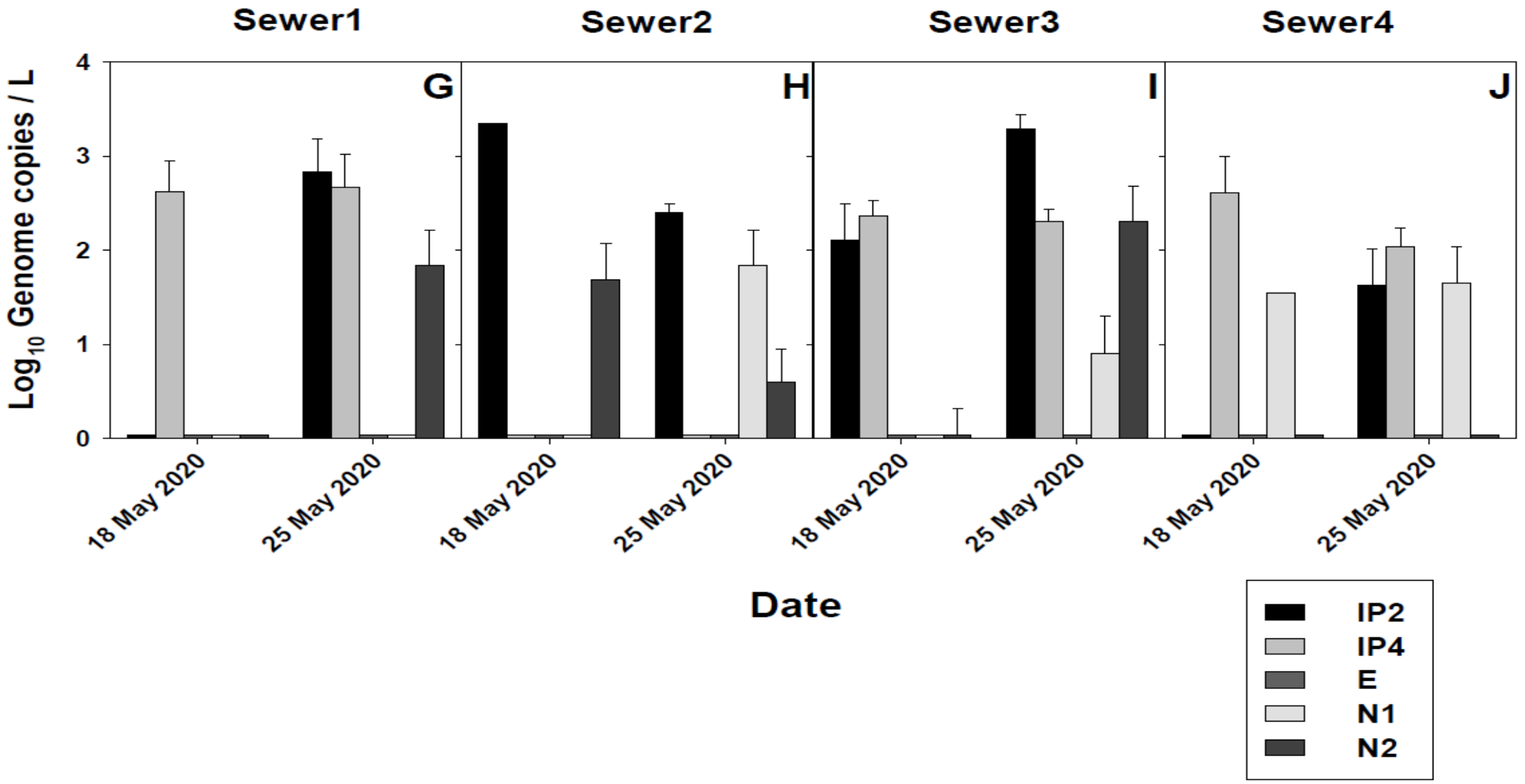
VIRUS ENTÈRICS





VIRUS ENTÈRICS

SARS-CoV-2 in Barcelona sewers – End of May 2020



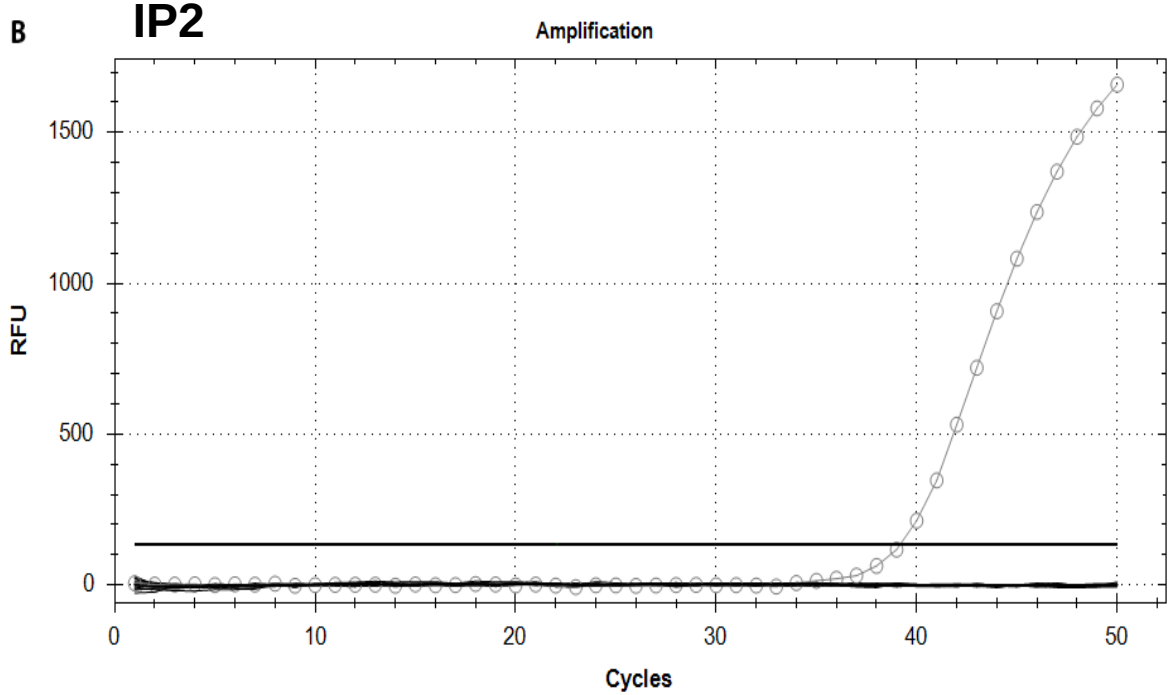
SARS-CoV-2 in raw sewage samples from March 2019

A

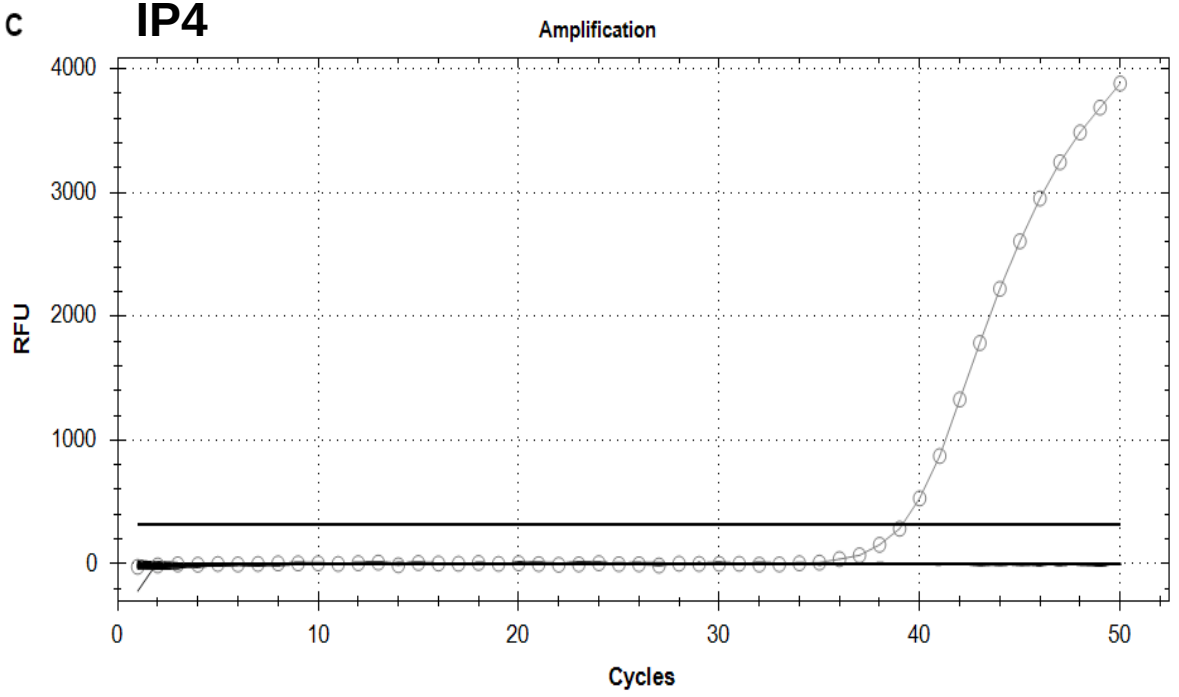
	IP2	IP4	E	N1	N2
January 16, 2018	No Ct	No Ct	No Ct	No Ct	No Ct
February 6, 2018	No Ct	No Ct	No Ct	No Ct	No Ct
March 6, 2018	No Ct	No Ct	No Ct	No Ct	No Ct
January 15, 2019	No Ct	No Ct	No Ct	No Ct	No Ct
March 12, 2019	**$6.4x10^2$ ***	**$8.3x10^2$ ***	No Ct	No Ct	No Ct
September 10, 2019	No Ct	No Ct	No Ct	No Ct	No Ct
October 2, 2019	No Ct	No Ct	No Ct	No Ct	No Ct
November 6, 2019	No Ct	No Ct	No Ct	No Ct	No Ct
December 11, 2019	No Ct	No Ct	No Ct	No Ct	No Ct

* Genome copies / L

B



C



SARS-CoV-2 in raw sewage samples from March 2019

A

	IP2	IP4
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February 6, 2018	No Ct	No Ct
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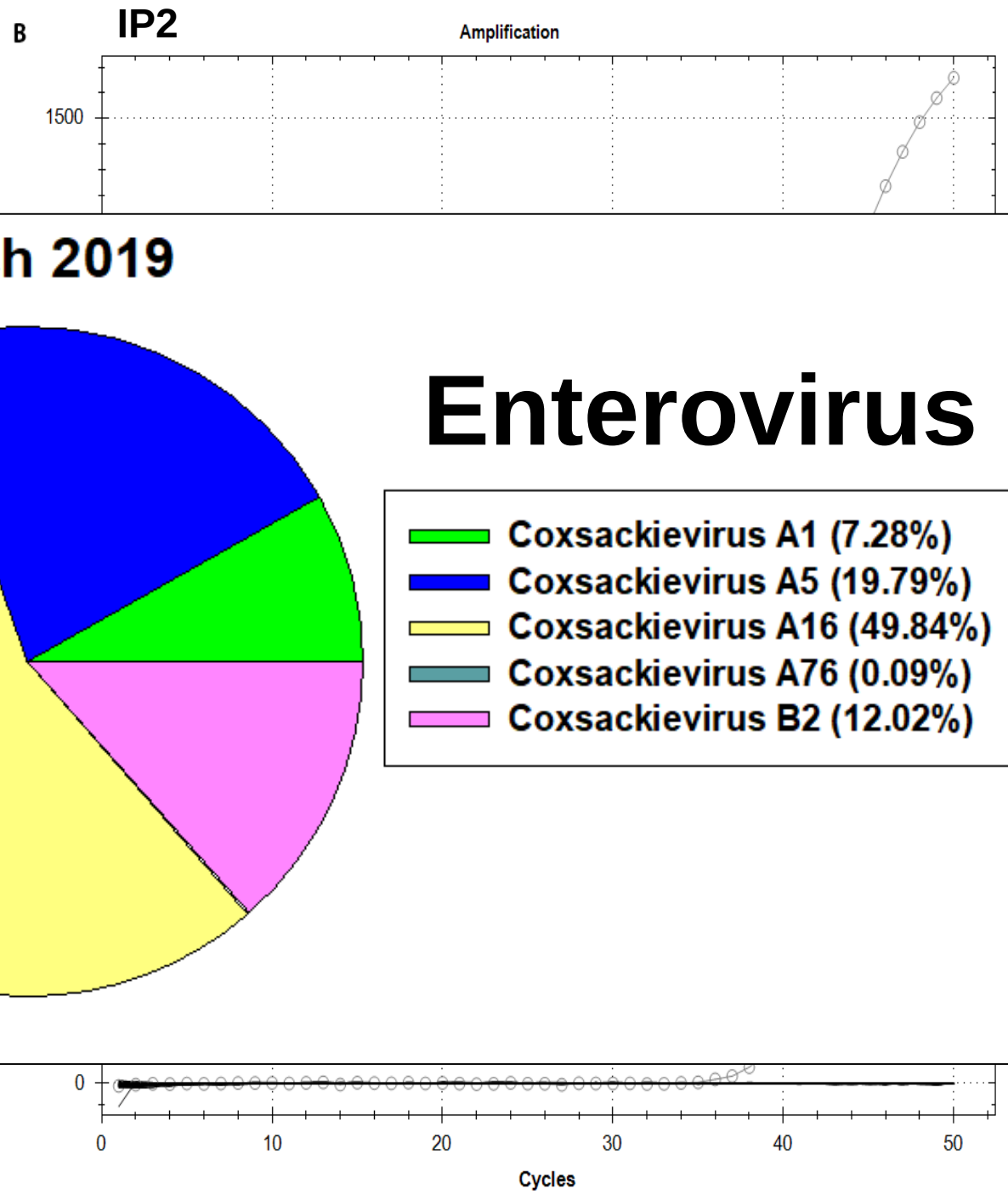
* Genome copies / L



SARS-CoV-2 has been circulating in northern Italy since December 2019: evidence from environmental monitoring

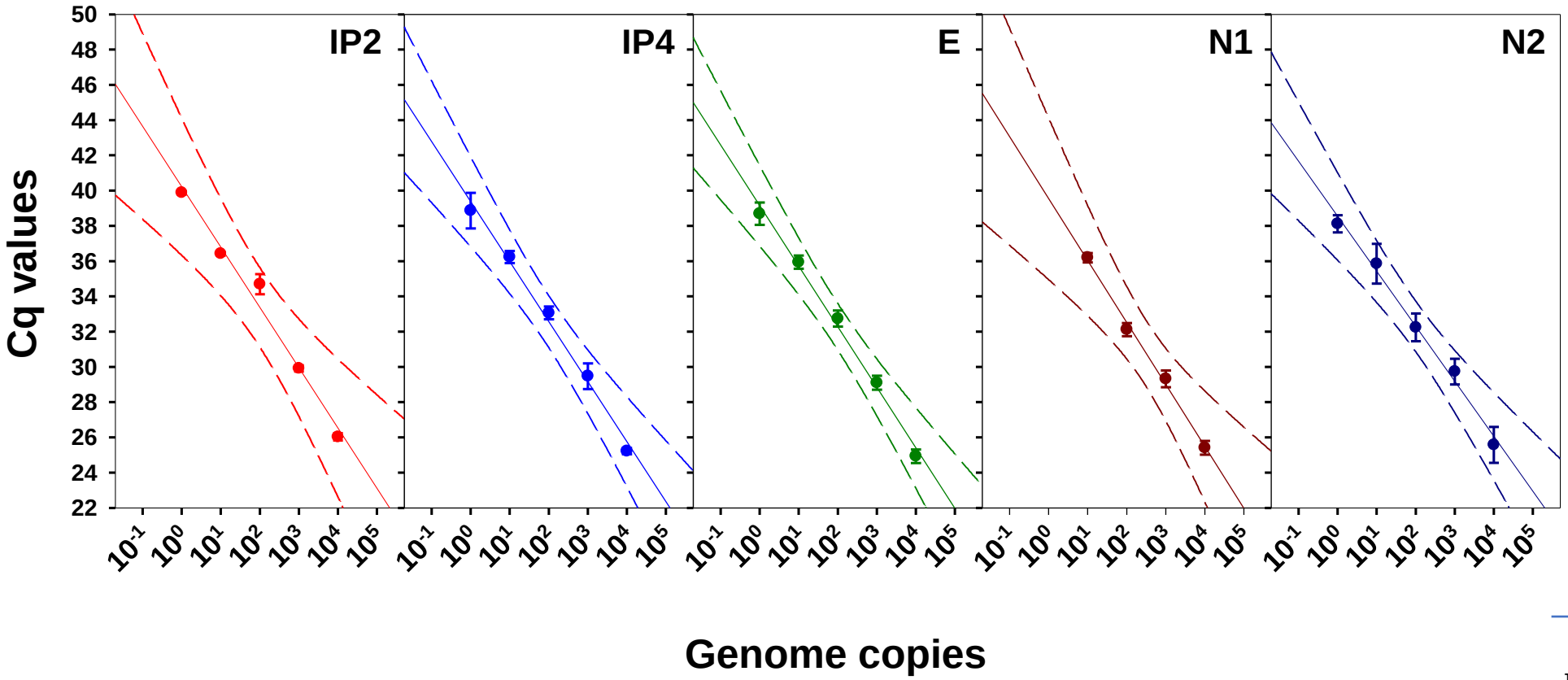
Giuseppina La Rosa[1*], Pamela Mancini[1], Giusy Bonanno Ferraro[1], Carolina Veneri[1], Marcello Iaconelli[1], Lucia Bonadonna[1], Luca Lucentini[1], Elisabetta Suffredini[2]

[1] Department of Environment and Health, Istituto Superiore di Sanità, Rome, Italy

[2] Department of Food Safety, Nutrition and Veterinary Public Health, Istituto Superiore di Sanità, Rome, Italy

Average standard curves for each of the targets used in this study (IP2, IP4, E, N1 and N2). A. Regression line (solid lines) and their 99% confident (dashed lines). B. Parameters defining each of the curves.

A

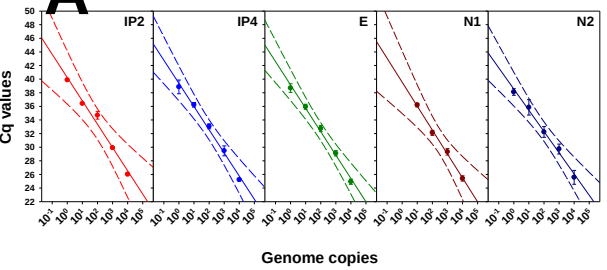


B

TARGET*	SLOPE	INTERCEPT	EFFICIENCY	R^2	Percent Replicates Positivity	
					10^1 Genome copies	10^0 Genome copies
IP2	-3.421	40.228	96.0	0.981	33	33
IP4	-3.404	39.376	96.7	0.992	67	28
E	-3.436	39.152	95.5	0.994	100	50
N1	-3.513	39.543	92.6	0.995	100	0
N2	-3.120	38.540	109.2	0.991	100	67

Average standard curves for each of the targets used in this study (IP2, IP4, E, N1 and N2). A. Regression line (solid lines) and their 99% confident (dashed lines). B. Parameters defining each of the curves.

A



B

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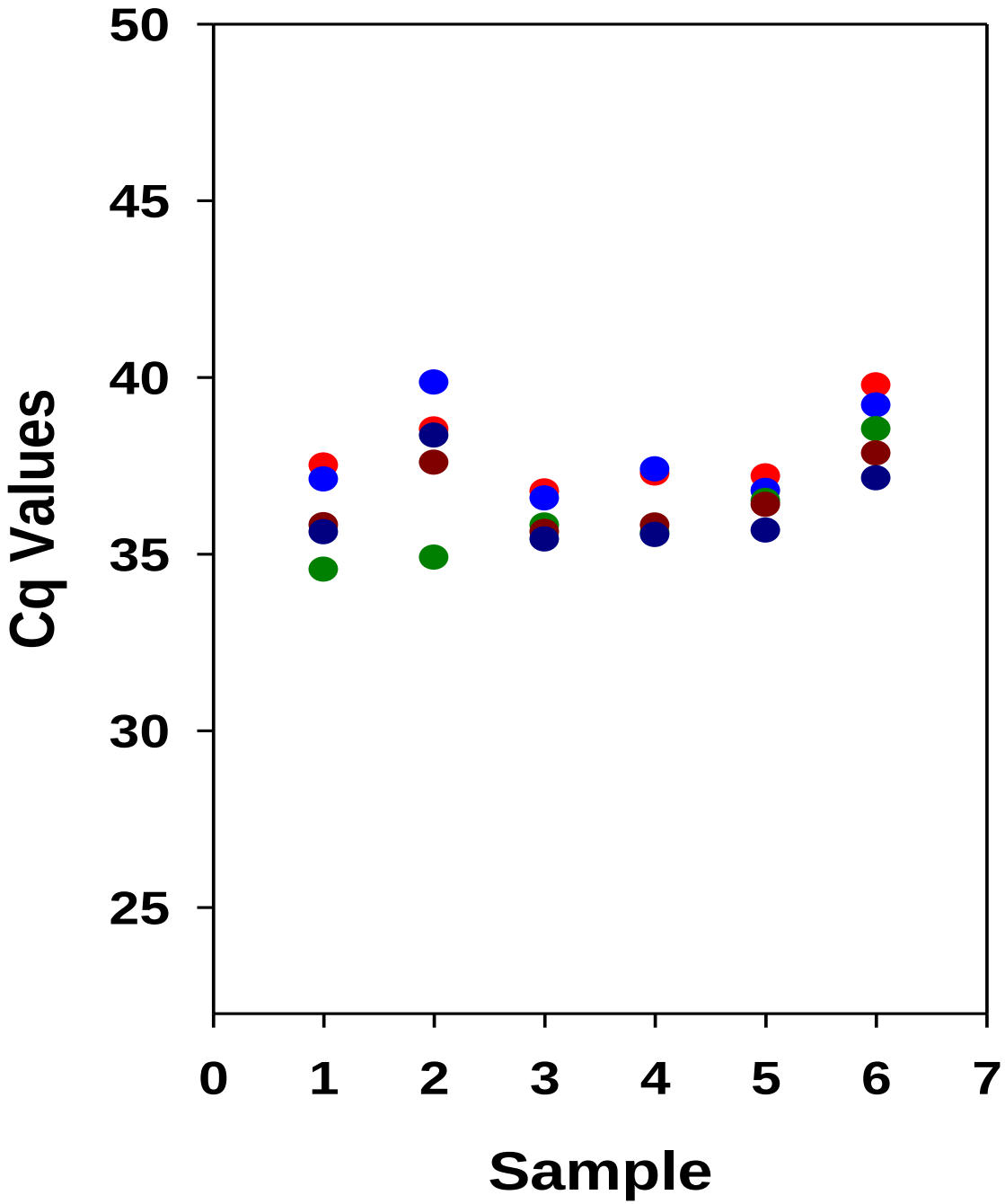
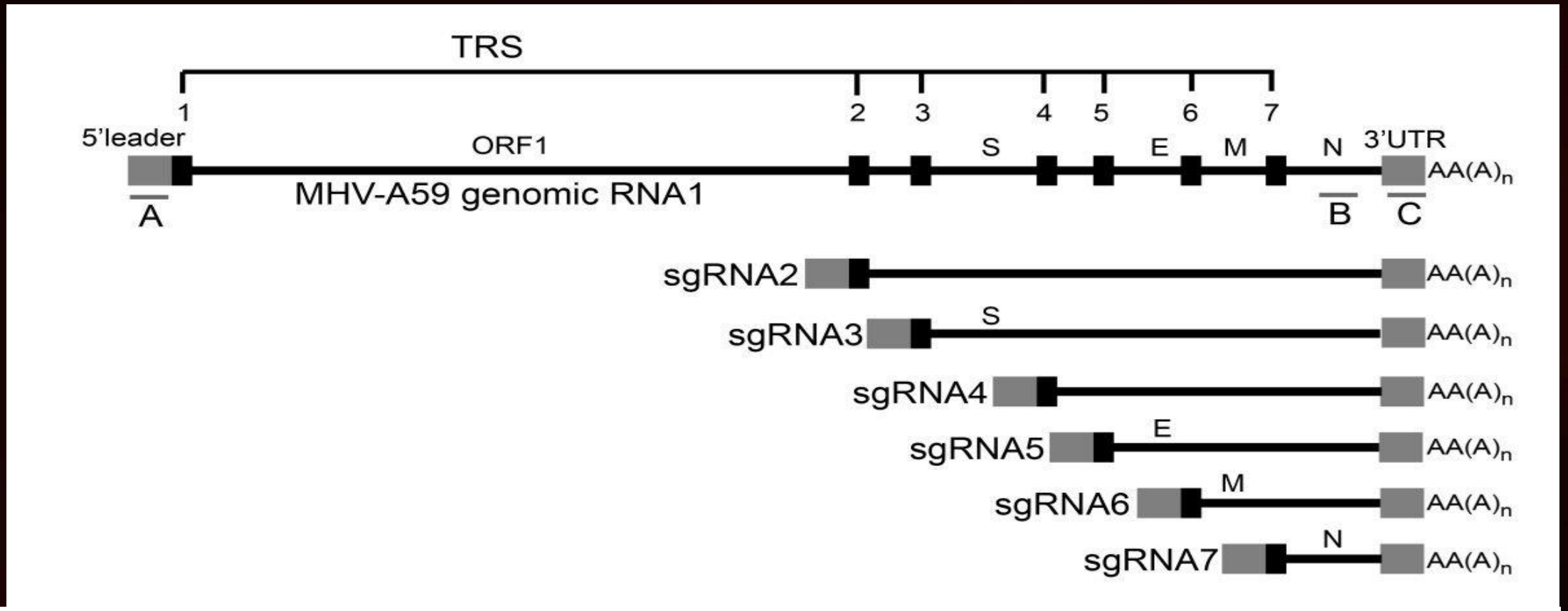
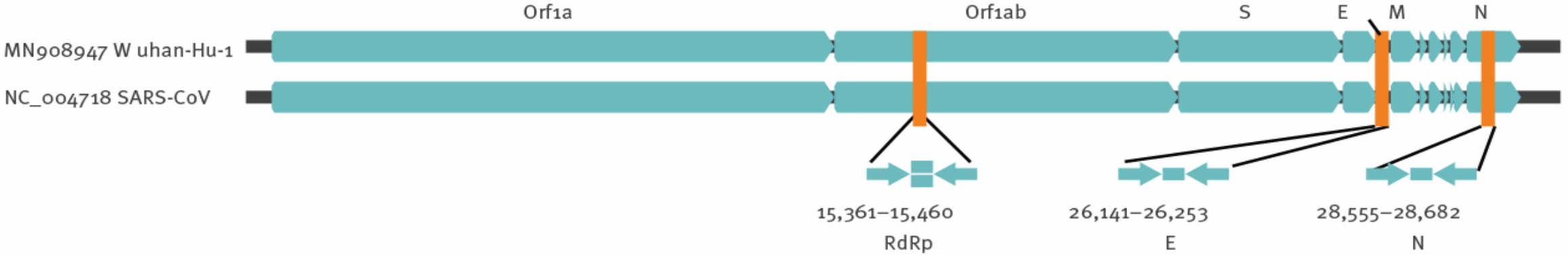


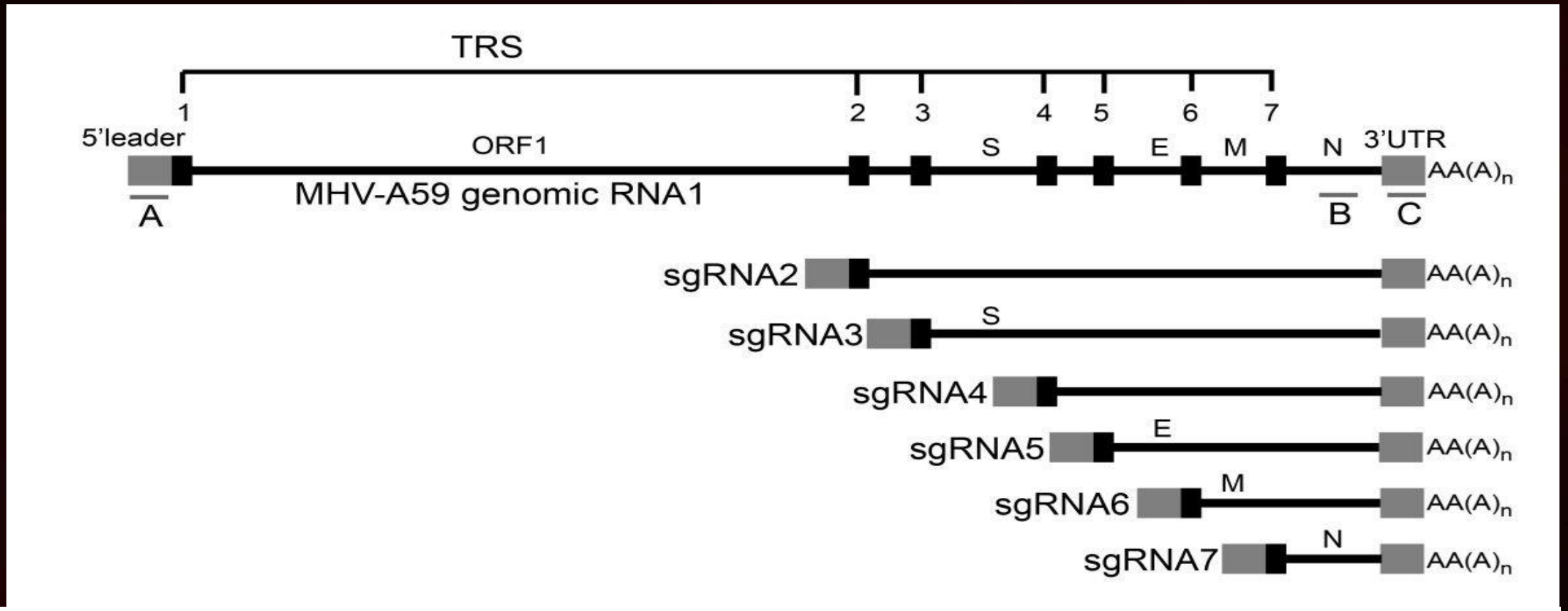
Levels of SARS-CoV-2 genomes (Cq Values) in 6 sewage samples employing the five targets (IP2, IP4, E, N1 and N2)

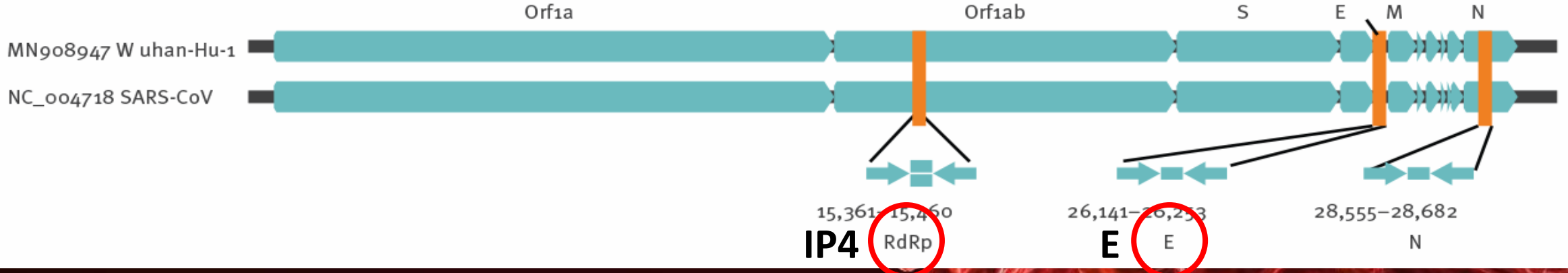
CoV Genome Organization and Expression

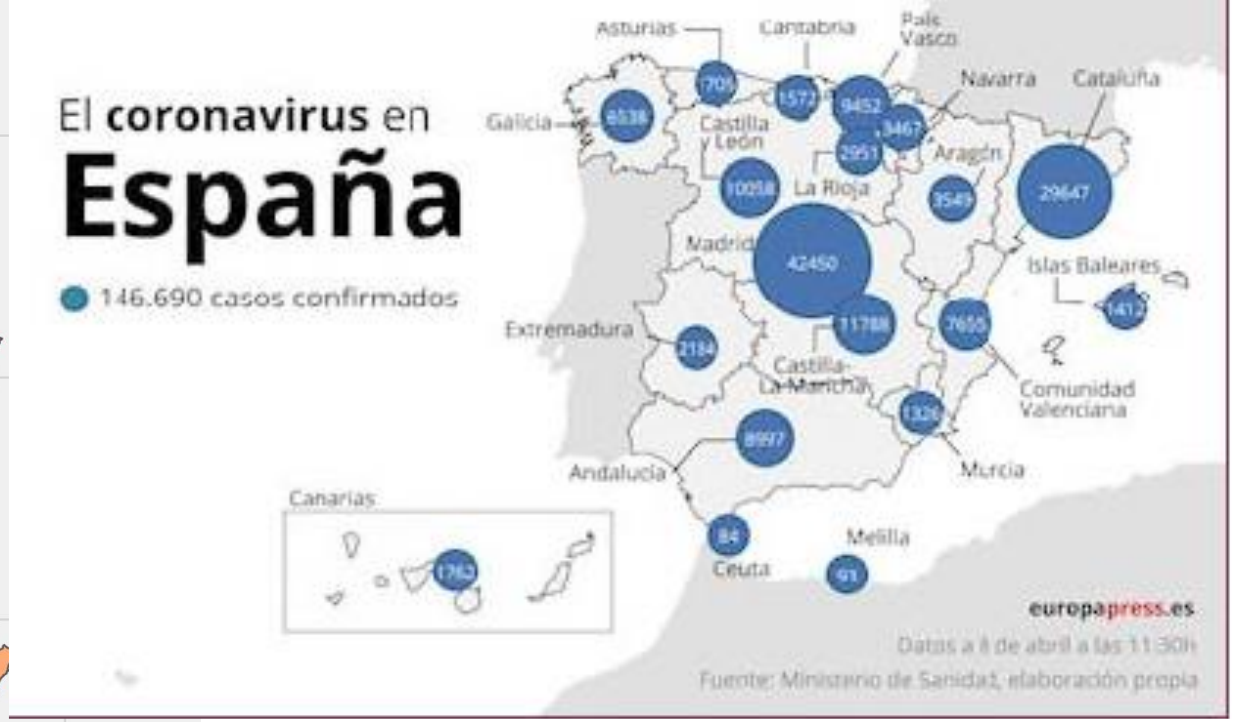




CoV Genome Organization and Expression

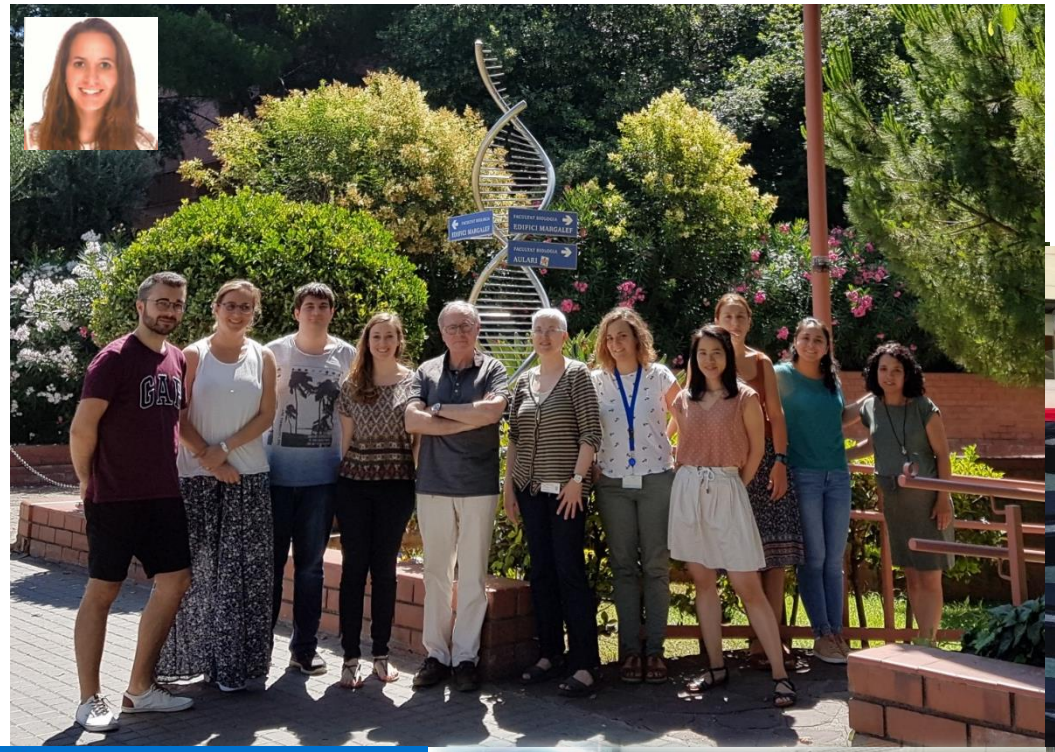






COVID-19 (02/05/20)

La vigilancia del SARS-CoV-2 en aguas residuales es una herramienta de alerta rápida para la COVID-19



VATar COVID-19

GOBIERNO DE ESPAÑA
VICEPRESIDENCIA CUARTA DEL GOBIERNO
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