



Anniversary

**Celebrating
100 Years
of the 1st EPN
discovery**

April 10-12, 2024
Logroño, Spain



Tuesday, 9th April

3 LOCATIONS

University of La Rioja,
Salón de actos Complejo Científico-Tecnológico

9:30 - 13:30 **Specialization course** (In Spanish)
Nematodos en los viñedos: problemática,
desafíos y bioindicadores salud del suelo

ICVV (Institute of Grapevine and Wine Sciences)

16:00-18.00 **Visit ICVV and Institutional Winery**
Includes transportation by bus.

Meeting point: Fuente Murrieta
Square (Logroño city centre) **at 15.45h**

Espacio Lagares (Logroño city center)

19.30-21:30 **Welcome reception and cocktail**



Wednesday, 10th April

RIOJA FORUM CONFERENCE CENTRE

8.30 REGISTRATION

9.30-10.00 CONFERENCE OPENING

9.50-10.00 ***Steinernema kraussei*, Steiner 1923: The story of two scientists and the first description of an entomopathogenic nematode.** [Ralf-Udo Ehlers](#)

10.00-10.40 **Legend speaker: Ramon Georgis.**
Entomopathogenic nematodes: a commercial journey

Chair: Ed Lewis

10.40-11.10 Coffee break

11.10-12.10 **SYMPOSIUM 1**
Systematics, Diversity & Biogeography

Chairs: Ricardo Machado & Antoinette Malan

African frontier: Tapping into entomopathogenic nematodes and symbiotic bacteria. [Antoinette Malan](#); Abate Birhan

Systematics and phylogeny of the entomopathogenic nematodes: the past, the present and the future. [Vladimir Puža](#); Hana Toušková; Emilie Ferreira; Martina Žurovcová

Taxonomy and systematics of the entomopathogenic bacterial genera *Photorhabdus* and *Xenorhabdus*. [Ricardo Machado](#)

12.15-12.45

FLASH PRESENTATIONS

Chair: Ivan Hiltbold

Bioluminescence protects *Heterorhabditis*-infected cadavers from nocturnal scavengers. [Maria D. Cassells](#); Sophie Labaude; Christine T. Griffin

***Xenorhabdus nematophila* and *Photorhabdus laumondii* (Morganellaceae) secondary metabolites for the management of *Plasmopora viticola* (Peronosporales: Peronosporaceae) on grapevine leaves.** [Ignacio Vicente-Diez](#); Jorge Dueñas-Hernani; Raquel Campos-Herrera; Alicia Pou

Exploring the potential of symbiotic bacteria as plant-growth promoters: a comprehensive evaluation on grape and wheat seeds. [Carlos Castañeda-Alvarez](#); Simona Prodan; Ximena Antiguay; Ernesto San-Blas; Alan Zamorano

Metabarcoding survey supports specificity of EPN-*Paenibacillus* sp. association and identifies potential bacterial antagonists of *Diaprepes* root weevil in a Florida citrus orchard. [Alexandros Dritsoulas](#); Homan Regmi; Kamali Shokoofeh; Lukasz Stelinski; Lauren Diepenbrock; Larry Duncan.

Genomics of in vitro dauer juvenile recovery of *Heterorhabditis bacteriophora* in monoxenic liquid culture with *Photorhabdus laumondii*. [Zhen Wang](#); Ralf-Udo Ehlers; Carlos Molina.

12.50-13.30

Poster session 1

13.30-15.00

Lunch

15.00-15.40 **Legend speaker: George Poinar (Virtual).**
Legacy of Entomopathogenic Nematology:
The early years 1932-1986

Chair: Larry W. Duncan

15.40-16.40 **SYMPOSIUM 2**
Bacteria biology, symbiosis, and application

Chairs: Patricia Stock & Selcuk Hazir

Natural products from *Xenorhabdus* and *Photorhabdus* bacteria:
Past, present and future. [Bode Helge](#)

To have or not to have a symbiont: Is that the dilemma of the
***Steinernema-Xenorhabdus* partnership?** [S. Patricia Stock](#)

***Xenorhabdus* and *Photorhabdus* bacteria: New sources of bioactive**
compounds. [Selcuk Hazir](#)

16.40-17.10 Coffee break

17.10-18.10 **SYMPOSIUM 3**
Behavioral Ecology

Chairs: Ivan Hiltbold & Christine Griffin

Finding (and keeping) a good resource. [Christine Griffin](#)

Group dynamics of entomopathogenic nematodes: Leaders lead and
followers follow. [Ed Lewis](#); Glen Stevens; David Shapiro-Ilan

Smelling in the dark and finding hosts: entomopathogenic
nematodes use environmental odors to efficiently forage. [Ivan](#)
[Hiltbold](#)

18.10-19.30 **Discussion session 1.**
From academia to industry

Chairs: Roxina Soler, Roxina Soler, Diana Londono,
Bart Vandenbossche, Ramon Georgis, Ralf-Udo Ehlers,
David Shapiro-Ilan, & Antoinette Malan

19.30-20.30 Welcome cocktail

Thursday, 11th April

RIOJAFORUM CONFERENCE CENTRE

8.30 REGISTRATION

9.00-9.40 **Legend speaker: Raymond Akhurst.**
Entomopathogenic nematode/bacterial
symbioses – an historical perspective

Chair: Patricia Stock

9.40-10.40

SYMPOSIUM 4
Population ecology

Chairs: Raquel Campos-Herrera & Monique Rivera

Enhancing the role of entomopathogenic nematodes in agricultural soil: advances in quantification and interaction analysis for effective biological control. [Raquel Campos-Herrera](#); Rubén Blanco-Pérez

Deciphering tritrophic connections between insect herbivores, entomopathogenic nematodes, and their insect hosts.
[Monique Rivera](#)

How to make your own IJs traceable with the use of quantum carbon dots? [Ernesto San-Blas](#); María José Cornejo; Patricia Morales-Montero; Gabriela Lankin; Macarena Olivares; Sebastian Faundez; Carlos Castañeda-Álvarez

10.40-11.10

Coffee break

11.10-12.10

SYMPOSIUM 5
Survival, Virulence and immunity

Chairs: Itamar Glazer & Ioannis Eleftherianos

Disclosing virulence factors of *Steinernema carpocapsae*.
[Nelson Simões](#)

Survival of entomopathogenic nematodes: Summarizing three decades of research with view to the future. [Itamar Glazer](#)

Using the *Drosophila* model to understand insect anti-nematode immunity. [Ioannis Eleftherianos](#)

12.10-13.20

Discussion session 2.
Global platform for advancing on EPN.

Chairs: Ralf Ehlers & Xingyue Li

13.20-13.30

Group photo

13.30-15.00

Lunch

15.00-15.40

Legend speaker: Noël Boemare.
Bacterial Symbionts of Entomopathogenic Nematodes

Chair: Sophie Gaudriault

15.40-16.40

SYMPOSIUM 6
Mass production, include safety & regulation

Chairs: Ralf Ehlers & Luis Leite

EPN contribution to transformation of agricultural practice: Production and safety. [Ehlers Ralf-Udo](#)

EPN production in bioreactors: some engineering aspects that would be considered. [Norberto Chavarria-Hernández](#); Carlos-Inocencio Cortés-Martínez; Marco-Antonio Islas-López; Ma.-del-Rocío López-Cuellar; Adriana-Inés Rodríguez-Hernández

History of EPN production in Brazil with emphasis on a new biphasic process – liquid/solid – for the control of *Sphenophorus levis*. [Luis G. Leite](#); Julie G. Chacon-Orozco; David I. Shapiro-Ilan; Fernando B. Baldo

16.40-17.10

Coffee break

17.10-18.10

SYMPOSIUM 7
Commercial use & Future targets

Chairs: Tshima Ramakuwela & Stefan Toepfer

Applications of entomopathogenic nematodes for the control of below- and above-ground maize pests. Stefan Toepfer: Xun Yan; Bart Vandenbossche; Patrick Fallet; Ted Turlings; Sergio Rasmann; Bancy W. Waweru; Joelle Kajuga; Rui Tang

Entomopathogenic nematodes and their symbiotic bacteria: from genes to field uses – the Italian experience. Eustachio Tarasco: Elena Fanelli; Alberto Troccoli; Giulia Torrini; Alessio Vovlas; Giovanna Curto; Leonardo Marianelli; Mirella Clausi; Diego Leone; Giancarlo Rappazzo; Francesca De Luca

Entomopathogenic nematodes take root in South Africa. Tshimangadzo Ramakuwela

18.15-18.45 **FLASH PRESENTATIONS**

Chair: Xingyue Li

Soil, water, nematodes. Ralf-Udo Ehlers

Unveiling the complex ecological relationship between entomopathogenic nematodes and earthworms. Maryam Chelkha: Kyle Wickings; Raquel Campos-Herrera

Volatile organic compounds of the black truffle: attraction or repulsion to EPNs? Implications for truffle beetle biocontrol Ivan Julià; Ivan Hiltbold; Ana Morton; Fernando Garcia-del-Pino

Identification of natural products regulating the symbiosis between entomopathogenic nematodes and their bacterial symbionts. Daniela Vidaurre Barahona; Edna Bode; Li Su; Helge B. Bode

Influence of natural products from entomopathogenic bacteria on nematode recovery Fatemeh Sayedain: Coralie Pavesi; Peter Grün; Helge B. Bode

18.50-19.30 **Poster session 2**

20.00 **Pincho's night at Laurel street (tapas+drinks)**

Friday, 12th April

RIOJAFORUM CONFERENCE CENTRE

9.00-9.40 **Legend speaker: Randy Gaugler.**
EPN Archeology: My Journey in the Golden Age

Chair: David Shapiro-Ilan

9.40-10.40 **SYMPOSIUM 8**
Application technology

Chairs: David Shapiro-Ilan & Mayra Rodríguez

Advances in application and formulation of entomopathogenic nematodes. David Shapiro-Ilan

Considerations for the delivery of EPN in orchards. Larry Duncan

Entomopathogenic nematodes as tool for pest management in developing country: Cuba, study case: Mayra G. Rodríguez Hernández; Roberto Enrique Regalado; Jorge Hernández Núñez; Martha R. Hernández Zaldivar; Mérida Rodríguez Regal; Yordano J. Alambares Carrió; Nilda Perez-Consuegra

10.40-11.10 Coffee break

11.10-12.10 SYMPOSIUM 9
Genome and Evolution

Chairs: Sophie Gaudriault & Ralf Sommer

Entomopathogenic nematode genomes. [Adler Dillman](#); Anil Baniya; Erich Schwarz

***Pristionchus pacificus* – developmental plasticity of feeding structures and the many features of entomophilic nematodes.** [Ralf J. Sommer](#); Hanh Witte; Waltraud Röseler

The endosymbiont and the second bacterial circle of entomopathogenic nematodes: from monoxenic paradigm to pathobiome. Ogier Jean-Claude; Pagès Sylvie; Frayssinet Marie; Akhurst Raymond; Boemare Noël; [Gaudriault Sophie](#)

12.15-12.45 FLASH PRESENTATIONS

Chair: Fernando Garcia del Pino

The potential of ShK domains of *Steinernema carpocapsae* as bioinsecticide. [Duarte Toubarro](#); Jorge Frias; Tiago Paiva; Nelson Simoes

Entomopathogenic nematodes to control wireworms: efficacy screening, and impact of morphometry and symbiotic bacteria. [Andrea Chacon](#); Fanny Ruhland; Salimata Drabo; Thibaut Smeets; Brice Checonni; Raquel Campos-Herrera; François Verheggen

Injection of entomopathogenic nematodes in tropical fruit trees for xylophagous pest management. [Roxana Myers](#); Cathy Mello; Tracie Matsumoto

Bacterial bioluminescence is an important regulator of multitrophic interactions in soil ecosystems. [Ricardo Machado](#)

Sky is not the limit: successful foliar application of *Steinernema* spp. entomopathogenic nematodes to control Lepidopteran caterpillars. [Kay Moisan](#); Olga Kostenko; Magda Galeano; Roxina Soler; Jose E. Belda; Sjoerd van der Ent; Ivan Hiltbold

12.45-13.30 Poster session 3

13.30-15.00 Lunch

15.00-16.40 SYMPOSIUM 10
New Frontiers in EPN

Chairs: Helge Bode & Ernesto San Blas

A versatile toolkit for genetic studies in *Heterorhabditis bacteriophora*: opening doors for future EPN research. Christopher Ogaya; Zhen Wang; Giulia Godina; Ralf Ehlers; [Carlos Molina](#)

Combining multiple baiting cycles with digital droplet PCR optimizes description of the distribution of entomopathogenic nematodes in French maize fields. [Elisabeth Depuydt](#); Jean-Claude Ogier; Nusrat Ali; Cécile Villenave; Anne Jimenez; Patrice Mahieu; Brendan Vouadec; Eric Nguema-Ona; Sophie Gaudriault

Controlling the fall armyworm in Africa with entomopathogenic nematodes. [Patrick Fallet](#); Didace Bazagwira; Carlos Bustos-Segura; Joelle Kajuga; Stefan Toepfer; Ted C. J. Turlings.

Entomopathogenic nematodes avoid scent of predatory mites. Shokoofeh Kamali; David Olabiyi; [Homan Regmi](#); Lukasz Stelinski; Lauren Diepenbrock; Larry Duncan

Exosomes are virulence factors in *Steinernema carpocapsae*. [Duarte Toubarro](#); Jorge Frias; António Marcila; Nelson Simões

16.40-17.10 Coffee break

17.10-18.30 Discussion session 3.
Breaking the Frontiers in EPN research

Chairs: R. Campos-Herrera & S. Patricia Stock

18.30-18.45 CONFERENCE CLOSURE



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Posters' list

	TITLE	AUTHORS	PRESENTER INSTITUTION
01	Contributions to the study of entomopathogenic nematodes against pests of agricultural and health importance in Argentina	Daiana Eliceche; Soledad Guevara; Matias Rusconi; Matias Rosales; Augusto Salas; Agustin Balsalobre; Dario Balcazar; Marina Ibañez; Laura Morote; Graciela Minardi; Gerardo Marti; Diego Sauka; <u>Fernanda Achinelly</u>	CEPAVE
02	Enhancing Thrips Control in Pepper: A Synergistic EPN- Kairomone Approach	<u>Gorkem Ates</u> ; Ozgur Ates; Tufan Can Ulu; Alper Susurluk	Bioglobal A.S
03	Does the EPN associated bacteria composition fluctuate after successive parasitic cycles in a Lepidopteran host?	Roux Chloé; Ogier Jean-Claude; Bedhomme Stéphanie; <u>Brillard Julien</u>	INRAE- Univ. Montpellier
04	<i>Metarhizium brunneum</i> (Petch.) vectoring by entomopathogenic nematodes in the context of compatibility to control soil-dwelling stages of <i>Spodoptera littoralis</i>	Yousef Meelad; <u>Brillard Julien</u>	INRAE- Univ. Montpellier
05	Assessing the performance of various spray nozzles in the application of entomopathogenic nematodes	Busra Sadic Ulu; <u>Tufan Can Ulu</u>	Bilecik Seyh Edebali University



06	Bioluminescence protects <i>Heterorhabdus</i> -infected cadavers from nocturnal scavengers	<u>Maria D. Cassells</u> ; Sophie Labaude; Christine T. Griffin	Maynooth University
07	Entomopathogenic nematodes to control wireworms: efficacy screening, and impact of morphometry and symbiotic bacteria.	<u>Andrea Chacon</u> ; Fanny Ruhland; Salimata Drabo; Thibaut Smeets; Brice Checconi; Raquel Campos Herrera; François Verheggen	University of Liege, Gembloux Agro-Bio Tech
08	Bioactivity of <i>Xenorhabdus szentirmai</i> metabolites against the ant fungus <i>Leucocoprinus gongylophorus</i>	<u>Julie G. Chacon-Orozco</u> ; Luis G. Leite; Ana Eugenia C. Campos	Instituto Biológico
09	Unveiling the complex ecological relationship between entomopathogenic nematodes and earthworms	<u>Maryam Chelkha</u> ; Kyle Wickings; Raquel Campos-Herrera	Cornell AgriTech
10	Selection of a South African <i>Heterorhabdus bacteriophora</i> isolate for in vitro liquid mass production for the biocontrol of <i>Thaumetobia leucotreta</i>	<u>Nicholle Justine Claassen</u> ; Murray David Dunn; Antoinette Paula Malan	Stellenbosch University
11	Metabarcoding survey supports specificity of EPN- <i>Paenibacillus</i> sp. association and identifies potential bacterial antagonists of <i>Diaprepes</i> root weevil in a Florida citrus orchard	<u>Alexandros Dritsoulas</u> ; Homan Regmi; Kamali Shokoofeh; Lukasz Stelinski; Lauren Diepenbrock; Larry Duncan	Agricultural University Of Athens

12	A novel biphasic process – liquid to solid – to produce <i>Steinernema rarum</i> , and its implementation to control <i>Sphenophorus levis</i> in Brazil	<u>Luis G. Leite</u> ; Julie G. Chacon-Orozco; David I. Shapiro-Ilan; Fernando B. Baldo	Instituto Biológico
13	Impact of the secondary metabolites synthesized by <i>Xenorhabdus bovienii</i> on the activity of beneficial soil organisms: viability and virulence of entomopathogenic nematodes	<u>Maria del Mar González Trujillo</u> ; Juan Artal; Ignacio Vicente-Diez; Sergio Álvarez-Ortega; Jorge Dueñas Hernani; Raquel Campos-Herrera	ICVV
14	Volatile organic compounds of the black truffle: attraction or repulsion to EPNs? Implications for truffle beetle biocontrol	<u>Ivan Julià</u> ; Ivan Hiltbold; Ana Morton; Fernando Garcia-del-Pino	Universitat Autònoma de Barcelona
15	Are EPNs compatible with essential oils? A novel approach for the integrated pest management of the truffle beetle	<u>Ivan Julià</u> ; Marina Seco de Herrera; Ana Morton; Daniel Tapia; Juliana Navarro-Rocha; Fernando Garcia-del-Pino	Universitat Autònoma de Barcelona
16	Evaluating the insecticidal potency of Entomopathogenic nematodes, bacterial symbionts and their products on tomato pests and natural enemies	Ariadni Papafoti; Nathalie Kamou; Vasileia Chatzaki; <u>Apostolos Kapranas</u>	Aristotle University Of Thessaloniki
17	Omics data provide more evidence on interactions among nematode-plant-insect	<u>Javad Karimi</u> ; Shokoofeh Kamali; Sepideh Ghaffari; Lukasz Stelinski	Ferdowsi University of Mashhad
18	Regulation of natural product biosynthesis in <i>Xenorhabdus</i> and <i>Photorhabdus</i> by an ancient metabolite	<u>Agnieszka Nurek</u> ; Paushali Chaudhury; Helge Bode	Max Planck for Terrestrial Microbiology

19	Genomics and Chromosome Structure of an Entomopathogenic Nematode	<u>Vera Ogi</u> ; Dorothy Maushe; Stefan Grob; Matthias Erb; Christian Parisod; Christelle AM Robert	University of Bern
20	The OptiNEPs project: deciphering the biotic and abiotic factors influencing the isolation of native entomopathogenic nematodes in French agricultural soils	Sire Zoé; Mnasri Refka; Cabre Lisa; Chabert André; Emonet Emeric; Gaudriault Sophie; Lecerf Elodie; Le-Cointe Ronan; Nguema-Ona Eric; Pagès Sylvie; Poggi Sylvain; Siegwart Myriam; Villenave Cécile; <u>Ogier Jean-Claude</u>	INRAE
21	Collection Of Entomopathogenic Nematodes, Biological Resources For Use As Bio-Control Agents	<u>Pagès Sylvie</u> ; Kamel Yascim; Antoine-Lorquin Aymeric; Ogier Jean-Claude; Gaudriault Sophie; Givaudan Alain	INRAE
22	Fine scale deposition of EPN by micro-sprinklers	<u>Homan Regmi</u> ; Gabriel Martinez; Larry W. Duncan	CREC, University of Florida
23	Efficacy of entomopathogenic nematodes on pupae of <i>Eucalyptus</i> snout beetle, <i>Gonipterus</i> sp. n. 2	<u>Innocent Rakubu</u> ; Agil Katumanyane; Brett Hurley	University of Pretoria, Forestry and Agricultural Biotechnology Institute (FABI)
24	Host-finding strategies of five South African entomopathogenic nematodes species	<u>Innocent Rakubu</u> ; Agil Katumanyane; Brett Hurley	University of Pretoria, Forestry and Agricultural Biotechnology Institute (FABI)

25	Influence of natural products from entomopathogenic bacteria on nematode recovery	<u>Fatemeh Sayedain</u> ; Coralie Pavesi; Peter Grün; Helge B. Bode	Max-Planck-Institute for Terrestrial Microbiology
26	Infection variations of Azorean <i>Heterorhabditis bacteriophora</i> strains against <i>Popillia japonica</i> from laboratory to field experiences.	Hugo Monteiro; Rubén Beltrí; Angel Ros; <u>Nelson Simões</u> ; Anna Garriga	Universidade dos Açores
27	The type strains of entomopathogenic nematode-symbiotic bacterium species, <i>Xenorhabdus szentirmai</i> (EMC), and <i>X. budapestensis</i> (EMA): a chronicle of a twenty-year-long story	András Fodor; Michael G. Klein; Maxime Gualtieri; Matthias Zeller; <u>Eustachio Tarasco</u> ; János Kiss; Katalin Lengyel; Virginia Pett; LeRoy Haynes; Andrea M. Fodor; David Chitwood; Tibor Vellai	University of Bari "Aldo Moro"
28	<i>Xenorhabdus</i> antimicrobial products: Genetic regulation of biosynthesis and perspectives of application	Zsófia Boros; János Kiss; Ferenc Olasz; Bálint Csikós; Nóra Föhrécz; Anna Sebestyén; János Ujszegi; Áttila Hettyey; László Makrai; <u>Eustachio Tarasco</u> ; Tibor Vellai; András Fodor	University of Bari "Aldo Moro"
29	Non-target safety of entomotoxic protease inhibitors and lectins from higher fungi for entomopathogenic nematodes	<u>Toepfer Stefan</u> ; Sabotic Jerica	CABI

Venue

CONFERENCE VENUE

Riojaforum Conference Centre

Calle San Millán, 23 - 25, 26004 Logroño, La Rioja

SESSIONS ROOM: Sala Polivalente 1 + 2

POSTER EXHIBITION: Main lobby floor -2

30	Apple codling moth control with EPN: climatic parameters for optimal timing of EPN application	<u>Bart Vandenbossche</u> ; Mike Barg; Verena Dörfler; Hartmut Kaiser; Nikolina Grabovac; Thorsten Rocksch; Ralf-Udo Ehlers	e-nema GmbH
31	Identification of natural products regulating the symbiosis between entomopathogenic nematodes and their bacterial symbionts	<u>Daniela Vidaurre Barahona</u> ; Edna Bode; Li Su; Helge B. Bode	Max Planck Institute for Terrestrial Microbiology
32	Genomics of in vitro dauer juvenile recovery of <i>Heterorhabditis bacteriophora</i> in monoxenic liquid culture with <i>Photorhabdus laumondii</i>	<u>Zhen Wang</u> ; Ralf-Udo Ehlers; Carlos Molina	Kiel University
33	Red imported fire ants committing suicide by taking poison under the stress of entomopathogenic nematodes	<u>Sheng-Yen Wu</u> ; Huatao Tang; Youming Hou	Fujian Agriculture and Forestry University

Hang up posters:

Wednesday, 10th April from 08:30

Take down posters:

Friday, 12th April until 19:00

Main lobby floor -2



Social Program

Tuesday, 9th April | 19:30

Welcome reception and cocktail

Espacio Lagares

Address: Ruavieja, 18-20, 26001 Logroño, La Rioja

Wednesday, 10th April | 19:30-20:30

Welcome cocktail

Riojaforum Conference Centre

Address: Calle San Millán, 23 - 25,

26004 Logroño, La Rioja

Thursday, 11th April | 20:00

**Pincho's night at Laurel street
(tapas+drinks)**

Meeting point: Plaza del Mercado

Friday, 12th April | 20:30-00:30

Winery free visit and welcome wine

Bodegas Franco-Españolas

Gala dinner and drinks

Bodegas Franco-Españolas

Address: Cabo Noval, 2, 26009 Logroño, La Rioja



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The background of the image is a dark, textured surface with a mix of deep purple and blue hues. Overlaid on this are several large, semi-transparent circular shapes in shades of light blue and white. These circles appear to be part of a microscopic or scientific visualization, possibly showing cellular structures or fluid dynamics. The overall effect is a sense of depth and scientific exploration.

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