

Nematology News

Nematologist in lockdown

Keeping nematodes in lockdown? No doubt this would be a successful management option to control parasitic nematodes if it would be possible. Maybe even harder is keeping nematologists in lockdown. Some of us experienced what it means to be in quarantine. We became sedentary, were surrounded by juveniles and Corona kilos might have turned our filiform shape into piriform. The use of mouth masks may have blocked some of our amphids but our enthusiasm was not affected as shown in the pictures below.



Nancy de Sutter (ILVO) counting cysts in the living room



Godfrey Asio and Cindy Elisabeth preparing substrate for nematode cultures at ILVO



Wim Wesemael (ILVO) finalising a project proposal with the input of two critical reviewers

Nematology education during the Coronavirus crisis concerning the International Master of Science in Agro- and Environmental Nematology (IMaNema) <https://imanema.ugent.be/>

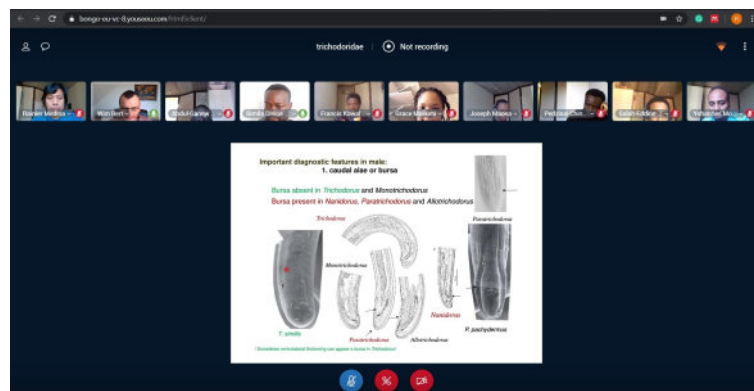
The master's programme in nematology at Ghent university (IMaNema) with support from the Belgian government (VLIR-UOS) has, over the past 27 years, trained around 450 nematologists, providing operational funds and scholarships for students from Africa, Asia and Latin-America. The programme is characterised by its multidisciplinary approach, including several hands-on exercises and the possibility of an international mobility option to Kenya. Lectures and practical exercises are provided by lecturers from Ghent University and by guest professors from our partner universities and institutes.

However, since the Covid-19 lockdown, Ghent University has been forced to implement **online lectures** through Bongo Virtual Classroom and MS Teams, **webinars** and **virtual microscopy** - applications and tools with which both students and staff have developed a love-hate relationship. In particular, **practical lab sessions and master theses work have been strongly affected**. Nevertheless, a student survey has revealed that our nematology students are coping relatively well with the measures that have been taken in these unprecedented times. However, some students have indicated that they do not feel happy, particularly due to their isolation and being far away from their families. For the upcoming exams, Ghent University is organizing both **off-campus** and on-campus **exams** that will require exhaustive and carefully planned logistics to conform correctly with the safety regulations. In IMaNema, all exams, except for nematode microscopy identification, will happen off-campus, and will involve online questions, oral exams, and online supervision.

It is important not to forget that this crisis must also be seen as a **challenge** that is forcing us to re-examine current practices, and opening the door to the **new opportunities and ideas** that will undoubtedly arise for both nematology education and academia as a whole. For example, our open-access **Nematology Digital Learning Platform (NDLP)** is further being put into place, aiming to serve as a freely accessible educational tool on which web lectures, exercises, tests, links to further information and demonstration videos are available. Online teaching is also a crucial aspect of our Erasmus+ Capacity Building in Higher Education project "Nematology Education in Sub-Sahara Africa (NEMEDUSSA)", which has been submitted to the EU and, if approved, aims at fostering an interactive and cohesive network of university partners (from SSA and Europe) in 2021-2023.

In general, **the future of Nematology education** at Ghent University **is likely to be conducted more and more in an online, internet-based approach**. Flying students from around the world to study in Ghent for two years will be, unfortunately, most likely not possible in the longer term. Moreover, in the short term, it is highly likely that our students will arrive next year (2021) with a significant delay. A mixture of online modules and dedicated hand-on exercises both on-campus and in the field could be the preferred solution moving forward. However, having everything only online is, in our opinion, not the way forward. For example, our attempts to provide instructional videos of video clips that simulate multifocal light microscopic observations of nematodes (virtual microscopy) will never be able to fully replace the real thing, *i.e.* microscopy, lab-work and fieldwork. This being said, we are sensitive to current events and wish to make it clear that your suggestions to best facilitate an excellent standard of on-line nematology education are very welcome!

Inge Dehennin & Wim Bert



Online teaching at Ghent University, IMANEMA

The Instituto de Ciencias de la Vid y del Vino in Spain supports COVID-19 research

The global pandemic produced by the COVID19 is a dramatic global situation causing strong impact on health care, social and professional life and families. Many Scientifics are involved in the race for a vaccine. Researchers have found other ways to contribute and support with medical assistance and studying the spread of the virus. The Instituto de Ciencias de la Vid y del Vino (ICVV) has also contributed with different direct and indirect actions. The first step was coordinating the donation of the alcohol and material available from the stock of all the research teams. These materials were shipped to the regional hospital. Then, a list of volunteers with probed skills to run PCR and qPCR to help in the analysis searching for COVID-19 was made. A total of four Nematologists that belong to the group "Agroecological Innovation in Vineyards" (<http://www.icvv.es/invid>) joined the list and waited for instructions to support the regional hospital in their screening. Meanwhile, other initiatives were promoted. For example, the members of the Department of Oenology modified their routines to produce alcoholic-gels to be distributed to the medial points and other working services from the Government of La Rioja. Also, a modelling approach was addressed to investigate the evolution of COVID-19 in European regions with high incidence (see details below). These examples are just few of the many contributions of the researchers all around the world, and in particular, the Nematologists.

Fernández-Recio, J. Modelling the Evolution of COVID-19 in High-Incidence European Countries and Regions: Estimated Number of Infections and Impact of Past and Future Intervention Measures. *J. Clin. Med.* **2020**, *9*, 1825.

<https://www.mdpi.com/2077-0383/9/6/1825>

Raquel Campos Herrera

From the President

Dear colleagues and friends, dear ESN members,

it has been a while since we met in Ghent for the 33rd ESN Conference in September 2018. The meeting was very successful with great science, outstanding organization and one of the most attended meetings in the history of the ESN. The banquets of ESN are famous for the dancing and fun, but this time it was outstanding. The music band made young and aged rock the floor. The interesting science attracted young scientists to the meeting, including the students from the Nematology Master Course at Gent University. I sincerely thank the organisation committee, Wim Wesemael, Lieve Gheysen, Tina Kyndt, Nicole Viaene and Wim Bert and their teams for organizing this excellent meeting that we shall remember for years to come.



Our next meeting was planned in conjunction with the other Nematology Societies. The 7th International Congress of Nematology was to take place in May 2020 in the beautiful Antibes in the South of France. As you all know, the meeting had to be postponed due to the Corona pandemic. We held a board meeting in Brussels on March 5, 2020 and connected with Pierre Abad and Larry Duncan. Together we decided to postpone to November 2020. However, very soon it was obvious that by November the situation would not in all countries be back to normal. Therefore, together with the 7th ICN Organizing Committee, IFNS President Larry Duncan, Vice President Ernesto San-Blas, Secretary Andreas Westphal and the 7th ICN Chair Pierre Abad, we scheduled to the 25th until 30th of April 2021. Unfortunately, the epidemic has not stopped. We are confronted with another wave. Therefore, the congress had to be postponed again to May 2022. The 35th meeting that is planned to take place in Spain is shifted to 2024.

More than 800 colleagues registered representing 60 different countries. Plenary speakers list and abstract selection are finished and the programme is ready and can be visited at <https://www.icn2020antibes.com/>. Thanks to the organising committee and the ESN board for gathering the programme and organising the bursary programme and to Pierre and his team for dealing with the problematic situation so professionally. I am sure that you will understand the special circumstances that forced us to postpone the meeting. I hope the financial losses related to the changes are not keeping you away from joining us in May 2022. We will have to review the programme in due time in order to up-date it. I hope the problems will soon be overcome so that we can safely meet again in 2022.

I wish you good health and see you in Antibes in May 2022.

Ralf-Udo Ehlers

Highlights of the first five issues of *Nematology* volume 22

The first five issues of volume 22 (2020) contain 39 full research papers, four short communications, three Forum articles and one book review.

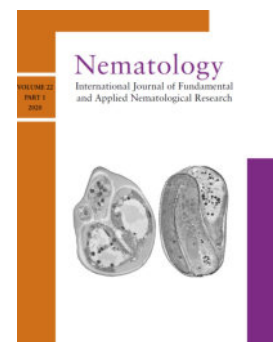
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ESN members are reminded that they can subscribe to Volume 22 (2020) of *Nematology* at the special individual e-only member subscription rate of €141/US\$159 (excluding VAT). Please send your order to brill@turpin-distribution.com, quoting action code 70258. Price group/type to be entered as 'society/member'.

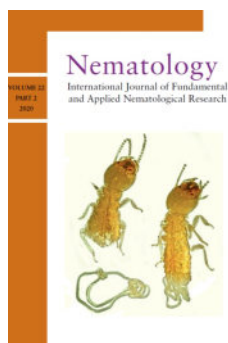
Each volume of *Nematology* contains 10 issues. *Nematology* publishes full Research papers, Forum articles, Review articles and Short Communications. All articles are available online with a DOI immediately corrected proofs are returned. *Nematology* papers, including the earlier papers of *Nematologica*, are available on Brill's online platform at: <http://booksandjournals.brillonline.com/content/15685411>

Here, Roland Perry highlights **a paper from each of the first five issues of Volume 22**.

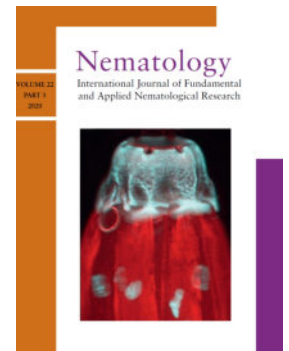
Issue 1. Forum articles were introduced as occasional contributions to enable an author to express a view or discuss a specific topic on current or fundamental subjects relevant to the remit of the journal. One aspect of nematology that requires attention is the knowledge transfer about plant-parasitic nematodes to growers, farmers and advisors, and training is an important part of effective information dissemination. In an **Open Access** Forum article, Laura Cortada and co-authors examine in detail the situation in sub-Saharan Africa (SSA) using a structured survey involving interviews with individuals from SSA that were (or currently are) involved in nematology training programmes, research, national extension services and in African universities (*Integration of nematology as a training and research discipline in sub-Saharan Africa: progress and prospects*; pp. 1-21. DOI: 10.1163/15685411-00003291). Over the past two decades, a few initiatives have been instrumental in building greater nematology expertise, including the influence of the nematology course at Ghent University, Belgium. Although nematology is still a little-known discipline in SSA, the results of this study show that important progress and increased awareness has occurred over the last two decades, allowing more nematologists to return to SSA to occupy qualified positions in academia, and in public or private institutions. The data in this paper will help policy makers, national agricultural and research programmes, academics and donors to identify the strengths, the weaknesses and the future opportunities to promote nematology further in the region.



Issue 2. In agro-ecosystems, both neutral (natural selection does not act on it) and non-neutral (adaptive) genetic variation need to be measured to identify the processes underlying the patterns of genetic variation within and among populations. To investigate the genetic variation and its underlying causes, *Heterodera schachtii* was chosen by Rasha Haj Nuaima and co-workers as a model nematode (*Significant genetic differences among Heterodera schachtii populations within and among sugar beet production areas*; pp. 165-177. DOI: 10.1163/15685411-00003297). The study used a PCR-DGGE fingerprinting technique to resolve the multiple variants of the gene *vap1* encoding the venom allergen-like protein 1. The authors examined the genetic variation of forty populations of *H. schachtii* within and among sugar beet areas, analysed the effect of tillage on the population genetic structure, and determined the factors underlying the *vap1* variation. There were significant differences in *vap1* patterns among populations and, overall, geographic distance and similarity of *vap1* patterns of *H. schachtii* populations were negatively correlated. The authors concluded that the population genetic structure was shaped by the interplay between the genetic adaptation and the passive transport of *H. schachtii*. The genetic marker of *vap1* is efficient for investigating the intra-specific genetic comparison of *H. schachtii* populations and for quantifying genetic diversity.

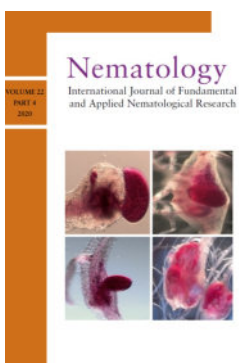


Issue 3. Sergei Subbotin *et al.* provide comprehensive phylogenetic analyses of 455 ITS rRNA, 219 *COI* and 164 *cytb* gene sequences of 11 valid and two undescribed species of *Globodera* from 148 populations collected from 23 countries (*DNA barcoding, phylogeny and phylogeography of the cyst nematode species from the genus Globodera (Tylenchida: Heteroderidae)*); pp. 269-297. DOI: 10.1163/15685411-00003305). *Globodera* displayed two main clades, the first comprised *Globodera* from South and North America parasitising plants from Solanaceae, and the second included *Globodera* from Africa, Europe, Asia and New Zealand parasitising plants from Asteraceae and other families. The authors hypothesised that *Globodera* species originated and diversified from several centres of speciation located in mountain regions and then dispersed across the world during the Pleistocene. Analysis of phylogenetic relationships of *G. pallida* and *G. rostochiensis* populations revealed incongruence in topology between networks inferred from mtDNA genes, which might be an indication of possible recombination and selective introgression events through gene flow between previously isolated populations. This puts some limitations on the use of the mtDNA marker as universal DNA barcoding identifier for potato cyst nematodes. The results are based on analysis of only three genetic markers; the authors point out that advancement in genomics technologies and the affordability of high-throughput nucleotide sequencing will permit more detailed information of evolutionary relationships, origin, spread and species distribution.



Issue 4. Small headwater streams contain numerous micro-habitats that facilitate the establishment of various nematode assemblages. In a paper entitled *Seasonal distribution of abundance, biomass and secondary production of free-living nematodes and their community composition in different stream micro-habitats* (pp. 401-422. DOI:

10.1163/15685411-00003313), Henrike Brüchner-Hüttemann and Walter Traunsperger report studies on the differences in the nematode assemblages from different micro-habitats of a single stream reach, including the sediment and the surfaces of dead wood, macrophytes and leaf litter, with monthly sampling over a 1 year period to determine possible seasonal dynamics of these communities. In total, 108 nematode species were detected in the micro-habitats. Abundances were highest on dead wood, whereas biomass and secondary production were highest in sediment. There were marked seasonal patterns of abundance and biomass in the sediment and on leaf litter. The annual mean species number was significantly higher in sediment and on leaf litter than on dead wood and macrophytes, whereas the annual mean Shannon-Wiener index was significantly higher in sediment than in all other micro-habitats. The study demonstrated that the composition of nematode communities from different micro-habitats within a single stream reach can differ markedly but the patterns of species abundance detected in micro-habitats within a single stream parallel those found in the sediment of stream and river macro-habitats.



Issue 5. In a Forum article Sergio Molinari addresses the question *Can the plant immune system be activated against animal parasites such as nematodes?* (pp. 481-492; DOI: 10.1163/15685411-bja10026). The general basal defence of plants against plant-parasitic nematodes can be overcome by the nematode secreting specific effectors. However, plants can be immunised or primed against endopathogenic nematode attacks and respond by letting only few invasive juveniles develop and reproduce. Immunisation of plants can be achieved by pre-treatments with chemicals that are functional analogues of the phytohormones that mediate defence reactions. In addition, plants provided with the beneficial microorganisms commonly present in a healthy rhizosphere have been found to be immunised. In this Forum article, two main tools to activate plant immune system and increase resistance are described: treatments with chemical activators and/or with beneficial microorganisms. Such treatments alone are not able to stop nematode infections; they decrease their impact on crops in terms of damage and production. The author considers nematode management must move towards induced resistance, and much of the required scientific knowledge and technology is already available.

Roland N. Perry
Editor-in-Chief, *Nematology*



**INTERNATIONAL FEDERATION OF
NEMATOLOGY SOCIETIES**

Dear participants,

The Seventh International Congress of Nematology meeting dates have once again been rescheduled due to the coronavirus situation. The ICN 2020 will be held 1-6 May 2022 at the Palais des Congrès in Antibes Juan-Les- Pins (France).

This decision was proposed by the meeting organizers in consultation with the European Society of Nematologists. Representatives of the 18 nematology societies comprising the Congress met and agreed unanimously that the change is necessary because of continuing uncertainty about when travel and meeting restrictions will end, and when most people will decide it is again safe to travel. All societies rejected the option of cancelling the 7th ICN, because it is the only nematology meeting fully organized, funded and ready to occur when the pandemic ends, and because cancellation would incur enormous financial penalties. Most other 2021 on-site, international conferences are rescheduling to 2022 for similar reasons.

The scientific program will be maintained as nearly as possible in its current form, but with revised dates. Authors will have the opportunity to revise their original abstracts and session organizers will have the ability to review and revise their agendas. We kindly ask authors not to contact us at this time as conference arrangements are being adjusted. More information will be sent in due course.

Bursaries that were awarded previously will be honored for those attending the Congress. A second bursary competition for graduate students is being considered, pending the availability of funds.

Official letters from the ICN Organizing Committee, requesting refunds/rescheduling of airline tickets for Congress delegates, will be sent to airlines and can be obtained from lwduuncan@ufl.edu.

Again, we advise you to make the appropriate changes regarding travel and, if you made your own booking (not with Alpha Visa Congrès), hotel reservations. Participant's registration fees will be transferred automatically and hotel reservations arranged by Alpha Visa Congrès will be rescheduled to the new dates which you will be able to modify according to new travel plans.

Registration for the Seventh International Congress of Nematology is currently 744 nematologists from 59 countries, including 100 student and early career scientist bursary recipients. The scientific program comprises 32 concurrent sessions with 288 oral presentations, 12 workshops, 12 keynote speakers, and poster sessions with more than 500 presentations. The mid-meeting excursions will provide outstanding opportunities to explore the splendid nature and the amazing culture of the French Riviera.

Very few nematology meetings will have occurred in the entirety of 2020-21. Hopefully, opportunities to interact virtually will be provided by some societies and possibly the IFNS in the coming months. But the 7th ICN will be an important opportunity to finally meet together again, face to face, to renew our work among friends, colleagues and students. We look forward to welcoming you in Antibes in 2022, where we shall celebrate an end to the crisis at a truly memorable scientific meeting.

Dr. Pierre Abad, 7th ICN Chair
Ernesto San-Blas, Scientific Program Chair
Larry Duncan, IFNS President

Florian Grundler elected as next IFNS president

Election Result for IFNS President

Please congratulate [Florian Grundler](#) who was elected to be the next IFNS President! In a close vote, ballots were received from all but two councilors with a majority vote among all eligible voters going to Florian. He along with [Thomae Kakouli-Duarte](#) (Secretary) and [John Jones](#) (Vice President) will assume their offices during the 7th ICN next spring.

Also our sincere appreciation to [Mara da Rocha](#) for her willingness to stand in the election and for her service to IFNS as a councilor and for her work to extend an invitation to hold an International Congress in Brazil.

Larry Duncan

ESN Newsletter

As of 2020, Bart Vandebossche (e-nema) will join Wim Wesemael (ILVO) to edit *Nematology News*, the newsletter of ESN.

The aim is to bring two issues per year (summer/winter). Contributions from members are strongly encouraged so don't hesitate to contact us. Lab profiles are welcomed, book reviews, interesting research, recent nematology PhDs or any other news that you seem fit to be shared with the ESN members. Also pictures and reports of conferences you attended are appreciated.

We would be happy to receive your contributions year round, deadline to be included in the next issue is 1st December 2020!

Bart & Wim

Why join the ESN? - the movie

Please have a look at our video "Why join the ESN?" made from some interviews during the 2016 ESN meeting. You can access this video via the homepage of our website <https://www.esn-online.org>

Also available at this address

https://www.dropbox.com/sh/ebk0lvge179crq2/AABu_zaqEM-YJayZB1Zr9ZC8a?dl=0

Twitter link : <https://twitter.com/ESNematologists/status/869574031032365056>

Nematode-based biocontrol agent wins international award

The biological plant protection product dianem® from e-nema won the Bernhard Blum Award. This award is presented annually by IBMA, the International biocontrol manufacturers association, to the most innovative biocontrol product of the year.

The product dianem® contains a genetically improved strain of beneficial nematodes against larvae of the Western Corn Rootworm and replaces chemical pesticides banned by the EU.

dianem® replaces neonicotinoid seed treatment and achieves the same or higher effectiveness compared to standard chemical pesticides (granulated pyrethroids). The product costs correspond to those of synthetic insecticides.

“By adaptation of application technology and breeding for higher virulence and field persistence we were able to reduce the application rate to 1 billion nematodes per ha.

Using the economies of scale in production we were further able to offer this product at competitive costs.”, says Prof. Dr. Ehlers, head of the research department at e-nema.

Link to the presentation from <https://www.e-nema.de/service-en/news/biocontrol-agent-wins-international-award/>



Prof. Dr. Ehlers and his team have won the Bernhard Blum Award

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Information needed for the newsletter

The ESN Governing Board would like this newsletter to be a Forum that is more widely used by the membership to share news and information. So, if you have any information and/or images that might be of interest to ESN members please send a note to the editors (Wim Wesemael - wim.wesemael@ilvo.vlaanderen.be or Bart Vandenbossche - b.vandenbossche@e-nema.de). All that is needed is a small amount of text in a word file or an email message, along with an accompanying image.