

Nematology News

7th ICN Antibes Juan-les-Pins

Uncertainty, postponement, cancellation, ...? It was perseverance, resilience, optimism and hard work that brought us the 7th ICN. It was worth the wait.



Dear ESN members,

The 7th International Nematology Congress (1-6 May 2022) has just ended in Antibes Juan-les-Pins (France). This congress was organized by the European Society of Nematology under the auspices of the IFNS. This was the first ICN with remote participation which demonstrated the potential of web tools to increase participation of members of the 17 IFNS societies. This event combined face-to-face and remote and this is the most difficult organizational format to set up, especially since we spent most of our time in 4 parallel sessions. Alpha Visa Congrès, the company in charge of organizing this congress, ensured a remarkable organization, with great efficiency in many ways during this week.

There were more than 800 participants registered, 240 of them remotely and 570 face to face, who really enjoyed coming together after two years of Covid-19 pandemic. The philosophy of this congress was to ensure the largest number of members and young nematologists to attend this conference, by charging a sliding registration fee with reduced rates for delegates from lower income countries, and granting 100 bursaries to students and early career nematologists. Bursary fundraising strategies were discussed, and colleagues worldwide identified who could fundraise.

After the postponement of the ICN 2020, Larry Duncan, IFNS President, Ernesto San Blas, IFNS Vice President and I met weekly to plan the scientific program, thereafter with each other and with the Alpha Visa team to operationalize that program. I would like to thank you all again for your enthusiastic contribution to the success of the meeting and also thank public partners, exhibitors and sponsors for their support, without whom none of this would have been possible. With the scientific committee we placed this conference on the theme of "Crossing borders: a world of nematode diversity and impact to discover", a timely subject as we have to reconcile the global importance of agricultural production with that of environmental conservation. I would like to thank the members of the different committees, the chairs of the sessions and of course my colleagues of the local organizing committee.

With Larry Duncan, we wanted, above all, to organize the ICN 2022 in person because more than a conference, the ICN 2022 is an experience, a celebration of the best of nematology and the gathering of our global community. This was a great opportunity to meet again and reactivate ourselves as a group for new scientific dynamics. The lectures of the meeting have been recorded and are available online until July, as well as the photo gallery. Participants will be able to extend a little bit the atmosphere of the 7th ICN both from a scientific point of view and during the social events.

Pierre Abad
7th ICN Chair

7th ICN 2022 in pictures



From the president

Dear Fellow ESN members,

First of all, may I say many thanks to Ralf for his longer than planned service to the ESN as a Governing Board member and latterly as President since 2014. His are big shoes to fill and I hope I can continue in his footsteps with the ongoing support of the other board members. Thank you also to Philippe Castagnone whose period of service as a board member has come to an end, fittingly with the very successful ICN conference in Antibes.

I was tremendously disappointed that I could not join you all there, especially since it had been so long since we were last able to meet in person. If there have been any positives from the last 2 years, one has been the increased accessibility of conferences and meetings, with virtual options allowing wider participation. Along with many others I was able to follow the ICN meeting online, and virtually attended as many sessions and workshops as I could. An added bonus was that the recordings were available to both in-person and virtual attendees, so that everyone could view the concurrent sessions that they missed. Congratulations to the conference organisers, Pierre Abad, and his entire team who provided a great and very smooth experience for the virtual attendees (and virtual speakers!). I hope any ICN attendees who returned home with an unwanted conference souvenir (Covid-19) have recovered with no lasting ill-effects.

It was a surprise, but an honour, when I was asked to be the next President of ESN, and I am grateful to everyone who supported my nomination. It's not something that I could ever have imagined when I moved to Leeds University as a new postdoc who had never even heard of nematodes! Then I quickly became hooked by their fascinating biology and the rest is history. This somewhat older postdoc is still as excited to look down a microscope at nematodes as she was all those years ago, and I hope that never changes.

We are very pleased to welcome two new board members who were also elected at the General Meeting. Wim Bert is no stranger to the board as he has been maintaining our website and Facebook page for a number of years. He will be familiar to many of you through his research and also his role as Director of the ImaNema Masters course at Ghent. Our second new board member is Shahid Siddique, now leading a group at UC Davis, California, but a member of ESN for many years since the days of his PhD studies in Vienna.

Those who had to leave early on the last day of ICN may have missed the presentation to two new Fellows of the Society. We were delighted that Danny Coyne and Pierre Abad will join an illustrious group of nematologists who have been recognised in this way for their work and contribution to the nematology community.

It was very encouraging, as ever, to see so many young, enthusiastic nematologists at the conference and to hear the plans for a Young Nematologists Network within ESN. This was a very welcome proposition, coming from the young nematologists themselves, and I hope that in the coming years ESN can engage its younger members more fully in the life of the society. We look forward to hearing more about the plans for their next events!

Best wishes,
Catherine Lilley

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

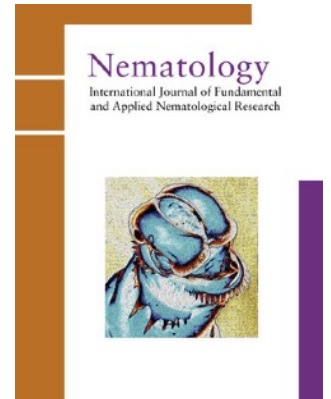
Twitter link : <https://twitter.com/ESNematologists/status/869574031032365056>

Highlights of the first five issues of *Nematology* volume 24 (2022)

The first five issues of this year's volume of *Nematology* contains 43 full Research Papers, one Review Article and three Book Reviews. The Impact Factor is 1.442. Each volume of *Nematology* contains 10 issues. 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>

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Below, Roland Perry highlights **a paper from each of the first five issues of Volume 24**.

Issue 1.

The continuing search for novel management strategies for plant-parasitic nematodes is reflected in this Review article by **Seenivasan Nagachandrabose** and **Richard Baidoo** entitled **Humic acid – a potential bioresource for nematode control** (pp. 1-10; DOI: 10.1163/15685411-bja10116). Humic acid is known to have toxic and antagonistic effects against many plant-parasitic nematodes, including *Meloidogyne* spp., *Rotylenchulus reniformis*, *Radopholus similis* and *Helicotylenchus multicinctus*. This article provides a synopsis of the humic acid-plant-nematode association and the prospects for using humic acid as an alternative to chemical control of nematodes. Humic acid controls plant-parasitic nematodes through various mechanisms including killing juveniles, inhibiting hatching, reducing nematode infectivity and reproduction, and induced systemic resistance. Soil application or drenching, seedling root dip treatment and foliar spray on leaves are effective for nematode control and humic acid is compatible with bio-inoculants such as *Azospirillum* spp., phosphobacterium, *Bacillus megaterium*, *Pseudomonas fluorescens*, *Trichoderma viride*, *Glomus* spp., *Pochonia chlamydosporia*, *Purpureocillium lilacinum* and *Trichoderma asperellum*.

Issue 2.

Meloidogyne incognita causes serious world-wide damage to cucumber, *Cucumis sativus*. Thus, the development of natural plant defence mechanisms to contribute resistance to *M. incognita* is a potentially eco-friendly control strategy. **Aatika Sikandar** and co-authors examined the molecular mechanisms of induced resistance by *Penicillium chrysogenum* against *M. incognita* through its use as seed coating (**Analysis of gene expression in cucumber roots interacting with *Penicillium chrysogenum* strain Snef1216 through seed coating, which induced resistance to *Meloidogyne incognita*** pp. 121-135. DOI: 10.1163/15685411-bja10118). The expression of 80 genes in roots of cucumber at four different infection time intervals was examined. The greater expression of defence-related or other vital genes demonstrated that *P. chrysogenum* strain Snef1216 induced priming of defence and plant growth-promoting responses. These data could contribute to breeding new nematode-resistant and biomass enhancing cultivars of cucumber.

Issue 3.

Meloidogyne enterolobii is a species capable of overcoming plant resistance moderated by the *Mi-1* gene, which is effective against most species of root-knot nematodes. In a study entitled ***Meloidogyne enterolobii* development and reproduction in tomato plants treated with resistance inducers** (pp. 283-288; DOI: 10.1163/15685411-bja10129) **Juliana de O. Silva** and colleagues evaluated the effect of induced resistance in tomato plants (*Solanum lycopersicum* 'H-9553') with the *Mi-1* gene against the development and reproduction of *M. enterolobii*. Seedlings of tomato 'H-9553' were transplanted into pots, inoculated with 2000 eggs and second-stage juveniles (J2) of *M. enterolobii* and treated with Acibenzolar-S-Methyl, *Bacillus subtilis*, *B. subtilis*+*B. licheniformis*+*Trichoderma longibrachiatum* and extract of *Reynoutria sachalinensis*. The plants were collected at intervals for the analyses of nematode penetration and development and reproduction. The use of *B. subtilis* increased fresh root weight when compared to the other treatments. There was a reduction in penetration of J2 in the roots of plants subjected to different resistance inducers. The population density of *M. enterolobii* was significantly reduced only when plants were treated with *R. sachalinensis*, indicating it as a potential resistance-inducing agent in tomato plants.

Issue 4.

A study by **Henrike Brüchner-Hüttemann and Walter Traunsperger** (**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) is the first to examine the seasonal variation of nematode abundance, biomass, secondary production and species composition at four different micro-habitats of a single stream. The annual mean values of nematode abundance, biomass and secondary production differed significantly between the micro-habitats. Abundances were highest on dead wood, whereas biomass and secondary production were highest in sediment. In the sediment and on leaf litter, nematode abundance and biomass showed pronounced seasonal patterns. The largest contribution to the total secondary production of the stream was from sediment nematodes. In total, 108 nematode species were detected in the micro-habitats during the 13-month study. Comparisons between them revealed differences in nematode species composition. 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 at all other micro-habitats. All micro-habitats in the studied stream, as well as the stream as a whole, were dominated by nematode species belonging to the deposit feeders.

Issue 5.

Meloidogyne graminicola and *M. incognita* are responsible for rice yield losses worldwide. Nematode secreted proteins are crucial for root invasion and establishment in the host. **Phong V. Nguyễn** and co-authors present some characteristics of a pioneer effector, *M. incognita* secreted protein 4 (*Mi-SP4*), which is required for infection in compatible rice - root-knot nematode interactions (***Meloidogyne-SP4* effector gene silencing reduces reproduction of root-knot nematodes in rice (*Oryza sativa*)**) (pp. 571-588; DOI: 10.1163/15685411-bja10152). *In situ* hybridisation assays revealed *Mi-SP4* expression in the dorsal pharyngeal gland of *M. incognita* second-stage juveniles (J2). *Meloidogyne-SP4* transcripts strongly accumulated in pre-parasitic J2 and decreased in later parasitic stages of *M. incognita* and *M. graminicola*. Transient expression of the nematode effector gene in *Nicotiana benthamiana* leaves and onion cells indicated that GFP-tagged *Mi-SP4* was present in the cytoplasm and accumulated in the nucleus of the plant cells. *In vitro* RNA interference (RNAi) gene silencing, obtained by soaking J2 with small-interfering (si)RNA si4-1, decreased *Mi-SP4* expression in J2 by 35% and significantly reduced *M. incognita* reproduction in rice. Similarly, host-mediated gene silencing of the nematode *SP4* effector candidate gene in transgenic rice plants significantly reduced *M. graminicola* reproduction. Thus, *Mi-SP4* is a pioneer virulence effector that plays an essential role in both *M. incognita* and *M. graminicola* pathogenicity on rice.

Roland N. Perry

Editor-in-Chief, *Nematology*

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Roland N. Perry has been elected as honorary member of the association of applied biologists (aab). Congratulations Rolo!

Young Nematologists Network (YNN)

Don't forget to become a YNN member using the QR code!

(Read more on page 9)



Obituaries

Vivian Blok (1956 – 2022)

Vivian Blok passed away peacefully at home on 4 April 2022, following several years treatment for cancer. Vivian was a native of Canada and much of her early education was there, graduating in 1980 with a B.Sc. from the University of Waterloo and in 1983 with a M.Sc. from the University of Saskatchewan. She moved to the UK in 1984 and was awarded a Ph.D. from the University of Cambridge in 1988 for her work on RNA polymerases of influenza viruses. After a short postdoctoral position in Cambridge, Vivian moved to Scotland in 1989 to what was then the Scottish Crop Research Institute (now The James Hutton Institute). Vivian worked briefly in the Virology Department on the biology of groundnut rosette virus, before moving to the Nematology team in 1992, where she spent the remainder of her career.

Vivian's work initially focused on genetic diversity of potato cyst nematodes (PCN; *Globodera rostochiensis* and *G. pallida*) and root-knot nematodes (*Meloidogyne* spp), including development of diagnostic tools, with the longer term goal of using this information to understand virulence/avirulence in order to inform management strategies. This work also led to a better understanding of the patterns of introductions of PCN into the UK and Europe. Part of this work included an examination of the potential use of mtDNA sequences as tools for tracking introductions and understanding population genetics of PCN. This led to the discovery that the mtDNA of PCN is extremely unusual – present as a multipartite circular genome as opposed to the single mtDNA circle present in almost all other animals. Further work uncovered other unusual properties including recombination and paternal contributions to the mtDNA profile. Her work on root-knot nematodes led her into the area of host range in these pathogens.

Vivian was at the forefront of how genomics and transcriptomics resources were developed and used for plant-parasitic nematodes. She and her colleagues generated some of the first expressed sequence tag datasets for plant-parasitic nematodes, something that led to the discovery of pectate lyases in *G. rostochiensis*, the first such gene in any eukaryotic species, a finding published in *Nature*. She also contributed to genome projects for *Meloidogyne incognita*, *G. pallida* and *G. rostochiensis*. More recently Vivian examined the impact of temperature on PCN life cycles with an eye to how predicted climate change might influence the potential for a second generation of PCN in Europe and the implications of this for management. She also worked extensively on resistance to PCN and was a passionate believer that UK breeding programmes should be producing more commercially successful varieties with resistance to *G. pallida*.

While Vivian was a hugely productive and accomplished scientist, her main driver was always to do work that was useful, particularly when such work would bring real improvements to people's lives. On a visit to SASA (Science and Advice for Scottish Agriculture) in the mid-2000s Vivian became concerned about the wellbeing of the team at SASA tasked with screening soil samples for the presence of PCN cysts, as they were involved in the arduous and repetitive process of examining samples under the microscope for the majority of each and every year. Furthermore, new EU legislation would require a huge scaling up of the samples processed in Scotland, and recruiting new staff for this work was not a realistic option. Vivian therefore worked with colleagues in SASA to develop and validate a PCR diagnostic for *G. rostochiensis* and *G. pallida* that would allow microscopical examination of samples and diagnosis of PCN to be replaced with a molecular tool. The new process also provides a valuable resource of DNA collected from field populations. More recently, much of Vivian's energy was directed at ensuring that resistance to *G. pallida* was a primary target for potato breeding programmes, particularly at The James Hutton Institute.



Vivian derived huge enjoyment from working with colleagues all around the world. She was a partner in many excellent international scientific projects, starting in the 1990s with a series of EU funded projects. Most recently she derived huge enjoyment from being part of the GLOBAL initiative, led by colleagues in Idaho and established following the discovery of a *G. pallida* infestation in that state. These projects allowed her to develop enduring and deep friendships with people across the world. She enjoyed the opportunities for travel that such collaborations bring and was always keen to experience the different cultures of the countries she visited. Travel also provided the opportunity for her to experience a wide range of artistic work, whether live theatre or music, painting or sculpture. Vivian hosted many visitors and went on many memorable road trips with these. Many of the students and visitors based in the Nematology lab at Hutton will have fond memories of being taken out for day trips to see some of Scotland during their visits – trips to the Isle of May in puffin season were a particular favourite. We will miss her keen intellect and her enthusiasm for life.

Vivian is survived by two sons, Rowan and Linden, to whom condolences are extended.

John T. Jones (The James Hutton Institute)
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Jon Pickup (SASA)

Clara Vieira dos Santos



Dr. Clara Vieira dos Santos passed away on the 26th of April 2022 at the age of 54. She began her research career in the late 1990s, working in the Nematology Laboratory of the University of Coimbra, Portugal, then led by Prof. Susana Santos, and continued doing research in Nematology up to about two weeks before she died. Rather than making her final months all about fighting cancer, she made a point of continuing business as usual as much as she could, and was out sampling, designing and conducting laboratory assays and supervising students during late 2021. She combined an immense dedication to her work and tirelessness, with wit and a great sense of humour that was hugely beneficial to her working environment, and will be sorely missed.

Clara was an all-round nematologist, mastering a range of techniques and skills, gathering a wide knowledge of several topics on host-nematode interactions, biological control, and plant-parasitic nematode diagnostics. She interacted and established collaborations with several research groups in Portugal and abroad, and her untimely death took many by surprise. Clara developed most of her career in the Coimbra group, obtaining her MSc (2002) and PhD (2013) under the supervision of Prof. Isabel Abrantes. For her PhD, she worked under the co-supervision of Prof. Brian Kerry and then of Dr. Rosane Curtis in Rothamsted Research, UK. She joined the Nematology group at the University of Minho, Braga,

Portugal, in 2018 to work with her long-time collaborators Prof. Teresa Almeida and Dr. Sofia Costa, and quickly made this her home, with her great team-working skills, creativity and enthusiasm increasing research outputs and inspiring students. She engaged the whole group in contributing to science dissemination, and one of her last achievements was being awarded the best outreach activity at the 2021 European Researchers' Night in Braga for the work titled 'The Importance of Being Nematode'.

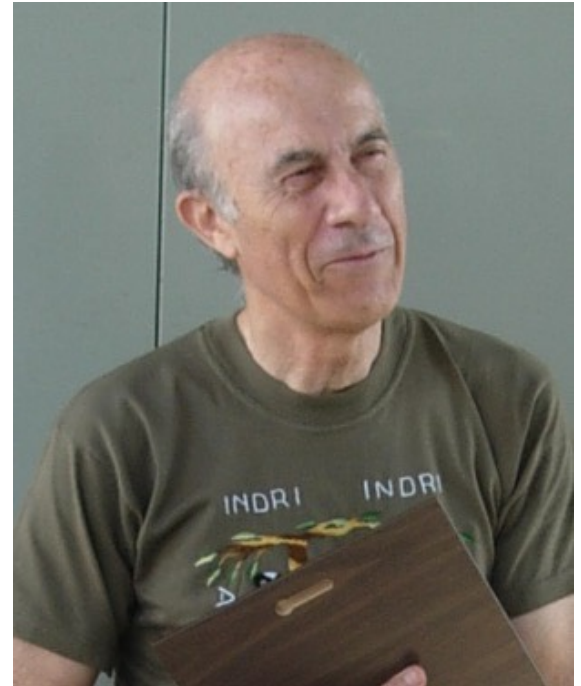
Clara's contributions to Nematology will persist through her published work and through research ideas she discussed with us and our students. For those of us who knew her, Clara has set a fine example of generosity, integrity and kindness that will not be forgotten.

Sofia Costa (CBMA UMinho)

Antoine Dalmasso

Antoine Dalmasso passed away on April 16, 2022, after several years of treatment for cancer. Antoine (Tony) was born in May 1937 in Nice, southern France, the eldest of a family of 2 children. He received his doctorate in biology from the University of Nice in 1970. He then joined the INRA center of Antibes and worked there throughout his career. During the first ten years, he studied the nematodes that transmit plant viruses. In particular, Antoine Dalmasso gained international recognition for his research on the nematode *Xiphinema index* and on the genetics of disease resistance in vineyards.

His work in the following decades focused on root-knot nematodes. He was widely recognized for his work, but also for his great human qualities. His knowledge of the field was vast, but his insatiable curiosity led him to master the most innovative research methods. This approach made him an international scientific reference in nematology and contributed greatly to the influence of INRA's global expertise in the field. With great humility and kindness, he always tried to transfer and spread his knowledge and passion to his students and colleagues, providing a modern vision of the approaches needed to solve agronomic problems.



One of Antoine Dalmasso's most important scientific contributions was the development of molecular nematology, as he was a pioneer in this field of research. His work on isoenzyme electrophoresis resulted in the first molecular markers for the identification of root-knot nematodes, a method that is still used in many laboratories around the world more than 40 years after the original publications. He also developed a successful approach to identify molecular determinants of pathogenicity and (a)virulence in *Meloidogyne*. Antoine Dalmasso began proteomics work using virulent and avirulent isogenic lines of *Meloidogyne*, which has resulted later in the characterization of genes believed to be involved in these traits. More importantly, he established a multidisciplinary research program on *Meloidogyne* that now includes studies at both the nematode and the plant levels.

He promoted European cooperation for plant nematology research with his colleague Fred Gommers from Wageningen. He was at the beginning of the collaboration between INRAE and Wageningen University and more generally at the beginning of the European collaboration that has resulted in a strong network in the field of plant nematology funded through many EU research projects. With more than 90 articles in international scientific journals and book chapters, Antoine Dalmasso was a pioneer in modern nematology by introducing molecular tools in the study of plant-nematode interactions and in the breeding of resistance to root-knot nematodes.

Antoine Dalmasso's strong involvement in the management of the INRAE research center led to a project born in 2004 with Sophia Agrobiotech Institute, a new research center dedicated to plant health in close collaboration with the Université Côte d'Azur and the CNRS. He retired in 1999, leaving behind a well-structured team of more than 25 people working in the field of plant nematology. He was awarded as Fellowship of the ESN in 2006 for his important and innovative contributions to nematology.

Antoine is and will be greatly missed by his wife Janine, his son Didier and his family, and equally by his valued friends and nematology colleagues.

Pierre Abad & Philippe Castagnone
INRAE, Institut Sophia Agrobiotech

Kicking of the Young Nematologists Network (YNN)

Following the success of the Virtual Nematology Conference 2021 (VNC2021) that gathered 154 PhD students, postdocs and as many supervisors, several of us who organized the conference decided to take a step further and establish the YNN as a branch of ESN. The aim of the YNN is to provide a platform particularly aimed at early career nematologists (master students, PhD students and postdocs), that will help us grow together through different activities. These activities will include seminars from different nematology disciplines that will be hosted by various experts and students all around the world and workshops on different practical and analytical methods in nematology and related disciplines. Importantly, we will also organize seminars and workshops that will support a professional development of young nematologists, including preparation of CV and motivation letters, grant proposal writing, manuscript writing and reviewing, mental health and time organization, and so on.

During the International Congress of Nematology (ICN2022), we kicked off the YNN with a presentation on the future plans of the network in front of the early career researchers and ESN members. This was followed by a social event at the near-by pub where we were able to more meet each other and chit-chat over a drink. In the meantime, we made different teams within the YNN, that include program preparation, social media presentation, website and team organization, and communication with the public and ESN. Currently, we are a team of four PhD students and four postdocs, including Jaap-Jan Willig (WUR), Nina Guarneri (WUR), Boris Stoiljkovic (UGent), Unnati Sonawala (Cambridge University) Adam Casey (University of Leeds), Nasamu Musa (Harpers Adam University), Xorla Kanfra (Julius Kuehn Institute), and Olivera Topalovic (Copenhagen University/WUR) that are supported by Prof. Geert Smart.

At the moment, we are organizing our first seminar and preparing many more interesting activities for you (please keep an eye on our Twitter page and website for more info). Finally, we would like to thank ESN for financing our social event at ICN2022 and for a continuing support.

Don't forget to become a YNN member using the QR code on page 5! 😊



YNN at the 7th ICN, Antibes, France

Upcoming meetings



61st Annual Meeting of the Society of Nematologists - Sept 26 - 29, Anchorage, Alaska

https://nematologists.org/2022_ALASKA

Advances in Nematology 2022

a one-day hybrid event hosted online and at The Linnean Society in Central London

-> **December 8th 2022**

<https://www.aab.org.uk/event/advances-in-nematology-2022/>



74th ISCP - Tuesday 23rd May 2023, Ghent, Belgium

A one-day event with parallel sessions on nematology, agricultural entomology and acarology, phytopathology, herbology and formulation and application technology, pesticide residues, toxicology and ecotoxicology



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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.