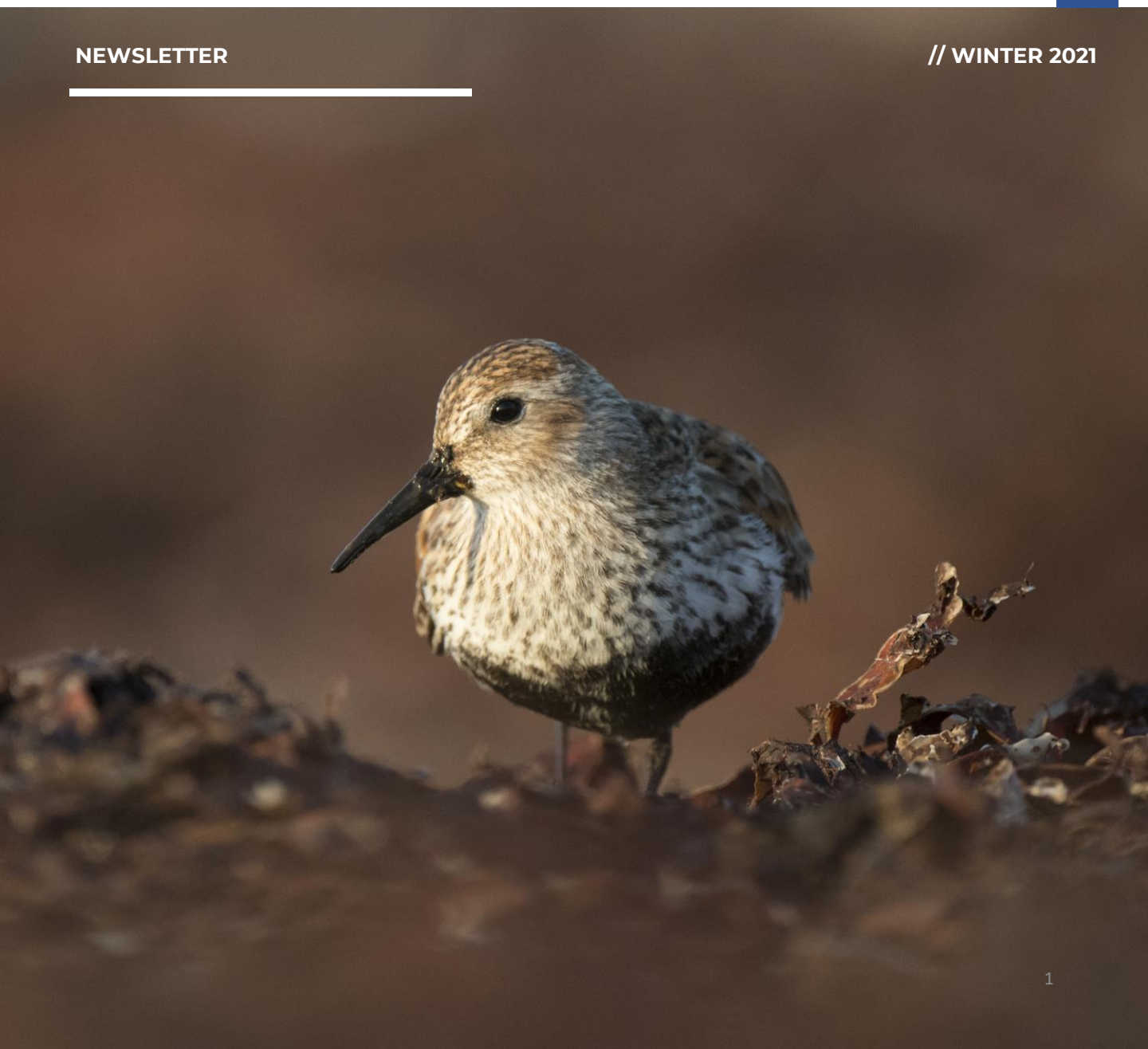
EWDA
European
Wildlife Disease Association

NEWSLETTER // WINTER 2021



CONTENT

ON THE COVER

Dunlin (*Calidris alpina*)

Photo by **Josh Jaggard**, wildlife photographer
Website: click here
Twitter: click here
Vimeo: click here

Editors
Anne-Fleur Brand & Erik Ågren

Disclaimer
The editors have tried to put this non-citable bulletin together as carefully as possible and apologise for any errors or omissions may have been committed.

President's Corner

"The time to act is now"

Autumn is my favourite season. It is a time of year where in my part of the world, I see nature changing the most. Right before autumn, the EWDA and WDA held their first ever virtual EWDA/WDA conference, which was a resounding success with an amazing 612 participants from 50 countries. What an achievement for the fantastic organizing committee! Bravo to them! Benefits drawn from the conference will be put to good use, with a special focus on our resourceful students.

Being chair of a section of the Wildlife Disease Association and seeing all the transformations put forward by the WDA Strategic Committee has been the highlight of my mandate. This Association, besides being an amazing place for sharing research, networking and a true family, is moving into a new dimension and becoming an indisputable Voice in the world.

The new directions and the Charter of Values have been published on the recently launched WDA website, alongside several other important messages:

- The WDA Urges World Leaders to Act Now on Climate Change as featured **here**.
- The WDA Council has released a response to the UN Climate Change Conference COP26 which you can read **here**.

We are channelling a similar energy at the European level. You all participated in the production of a statement supporting ECHA's proposal to restrict the use of lead in outdoor shooting and fishing. Our Sustainability Committee is hard at work on new recommendations as featured in this newsletter (page 9).

To support these values and continue to work by our side, do not forget to renew your membership **here**.

WDA Council has extended the 2021 pandemic relief membership rates for 2022 and continuation of free author page charges in JWD for 2022. Now is the time to get the most value from your membership !

Happy holidays and take good care!

Karin Lemberger
Vet Diagnostics and Faunapath, Lyon, France

News from the Board

"EWDA board – summer & autumn months"

In recent months, the EWDA Board met - again virtually - in August and December to discuss and debate issues that arise in the various EWDA groups and committees. In particular, the Small Grants Committee has been very active and diligent in breathing life into the "Amanda Hawkswood Wildlife Health and Welfare Research Grant", which is based on a large donation from the deceased Mrs. Hawkswood. The committee did its work so successfully that in the end all members had to read and evaluate a total of 18 applications for the three different grant categories.

The EWDA network committee had similar busy times in the summer, organising a network meeting that took place the day before the big joint WDA/EDWA "Cuenca conference". And if you thought the initial activities of the Sustainability Committee in calculating the CO_2 emissions of past EWDA conferences weren't complex enough, it seems the committee members are just getting started. A tremendous thank you goes out to all of them!

For all members living in one of the countries that are geographically counted as part of Europe, nothing changes in the membership renewal. Once you renew your membership, there is no need to check additional "EWDA" tick boxes, because WDA automatically sorts by geographic location of the address. However, while last year all EWDA members who live in countries outside Europe and who checked the "EWDA" box in addition to their WDA subsection of origin did not have to add any additional fee (i.e. $10), this situation had to be brought in line with the other WDA subsections for 2022.

We hope that nevertheless all members living overseas will continue to maintain their interest in EWDA. All additional small fees will add up to financially support the EWDA Small grants and/or EWDA student chapter.

For 2021, the EWDA community consists of 298 members from 24 European countries plus 36 members from 4 Scandinavian countries and 88 members from 10 overseas countries.

As a last request I would like to remind you about the new EWDA website: If anyone knows about an interesting event or just shot a great photo of wildlife creature or from a current wildlife project please feel free to contact our webmaster Alberto Casado Gómez. He is always very active and uploads everything online quickly.

Have a merry Christmas and a happy New Year !

Gudrun Wibbelt
Leibniz Institute for Zoo and Wildlife Research, Berlin, Germany

14th EWDA Conference Greening

"The reforestation project in Cuenca has been launched!"

The WDA/EWDA Virtual Conference of Cuenca brought together more than 600 WDA colleagues from over 50 countries in a secure and environmentally friendly meeting. The COVID-19 pandemic contributed positively to the virtual conference's carbon footprint being the smallest of all WDA conferences, thus counterbalancing the pain of not being able to meet face-to-face with our dearest colleagues with the joy of reducing our environmental impact. To make this joy even greater, the conference Organising Committee, in line with the recommendations of the EWDA Sustainability Committee, planned an environmental activity to offset the greenhouse gas emissions of this conference and, mainly, of past and future face-to-face conferences.

Mediterranean forests suffer every year from the negative effects of fire and, with it, a series of environmentally negative cascading effects such as the emission of greenhouse gases, the loss of trees that fix environmental carbon dioxide and the loss of soils and biodiversity. In 2009 a fire devastated in just one week 1700 ha of Mediterranean forest in 'Las Majadas', Cuenca, Spain.

After 10 years, no natural regeneration of the forest is observed and its progressive reforestation is planned.

What better contribution than to reconstitute what fire destroyed in order to mitigate the footprint left by Wildlife Health professionals? What better place than the venue of the joint conference?

The primary objective of reforestation is to ensure its viability over time, so the best way to contribute to this viability has been to generate a joint project with the regional environmental authorities to contribute to the reforestation of almost 3 hectares of burnt forest, to protect the trees from wild and domestic herbivores and to take care of the reforestation over time so that the forest will regain its splendour in a few decades.

With the arrival of the rains and snow in the 'Serranía de Cuenca', the planting of 1800 seedlings of Pinus nigra, Pinus sylvestris and Juniperus thurifera will start at the end of next winter. During a recent visit we were able to obtain some images of the reforestation area, already prepared to start the plantation.

Francisco Ruiz-Fons & Mª Ángeles Risalde

IREC & Univ. of Córdoba, Ciudad Real & Córdoba, Spain

14th EWDA Conference Greening

"The planting of 1800 seedlings of Pinus nigra, Pinus sylvestris and Juniperus thurifera will start at the end of next winter."

We will keep you duly informed of the progress through the EWDA newsletter.

News from the Small Grants Committee

"Record number of EWDA grant applications"

This grant cycle we received a record number of 18 applications for the available research grants. The committee was impressed by the range of proposed projects, the range of wildlife species being studied, the quality of the applications and the wide geographical spread of the proposed research.

Countries represented: Spain, Portugal, Switzerland, South Africa, Bulgaria, Romania, Norway, Hungary, France, Sweden, Italy.

Species to be studied range from crayfish to whales, bats, amphibians, and raptors. The competition this year was strongest for the Wildlife Conservation Research Grant. We were in a fortunate position to offer three €3000 grants for wildlife research and the grants committee has, after thorough evaluation, selected the following successful candidates:

1. Wildlife Conservation Research Grant:

- Helena Costa, Norway.

Non-invasive respiratory pathogen screening of free-swimming North Atlantic humpback (*Megaptera novaeangliae*) and sperm whales (*Physeter macrocephalus*).

Helena explores non-invasive techniques to analyse respiratory samples from free-swimming whales for pathogens (photo credit: Charles Lavin).

A first fieldtrip was undertaken in November 2021 to explore the feasibility of using a drone to collect blow samples from humpback whales during their southward migration along Skjervøy, Norway. After a week of sampling in harsh and freezing conditions, 16 blow samples were collected.

The EWDA Grant will be used to fund the screening of these samples for pathogens; there is very limited information about respiratory pathogens in whales.

News from the Small Grants Committee

2. Grant for Wildlife Health Research and Education in Eastern Europe:

- Tamara Szentivanyi, Hungary and Romania.

The effect of host blood meal on pathogen presence and diversity in bat-associated ticks.

Tamara will evaluate the host spectrum of bat-associated ticks and explore the presence and diversity of potentially zoonotic bacterial pathogens. Additionally, they hope to provide guidance for future pathogen surveillance and diagnostics in wildlife by contributing novel information about vector feeding habits and the potential drivers of pathogen presence and diversity (bat photo credit: Attila D. Sandor).

3. The Amanda Hawkswood Wildlife Health and Welfare Research Grant:

- Simone Pisano, Switzerland.

Optimizing a non-destructive field-based sampling method for the detection of *Aphamoyces astaci*, the causative agent of the crayfish plague.

Improving crustacean welfare and conservation of protected crayfish species. The establishment of a more practicable sampling method for the detection and genotyping of *A. astaci* may increase its application under field conditions by various interest groups (e.g., fishery inspectorates, fish wardens, researchers of different disciplines, environmentalists), and reduce the impact on animal welfare in the framework of wildlife health investigations.

We do hope that those projects that did not receive a grant this year will apply again in the future. Further details can be found **here**.

Paul Holmes, on behalf of the EWDA Small Grants Committee (Helle Bernstorf Hydeskov, Gábor Czirják, Gorazd Vengušt, Emmanuelle Gilot-Fromont, Ignasi Marco, Alessandra Gaffuri).

Paul Holmes
Animal and Plant Health Agency, Shropshire, England

News from the Sustainability Committee

"A report of the questionnaire on the sustainability of wildlife research and teaching"

A questionnaire was created by the EWDA Sustainability Committee with the aim of learning more about the impact of research activities on the environment and the current situation regarding sustainability in different institutes. This information could be used to provide a baseline for the current sustainability situation in wildlife health research, which we can use to further advise on improving sustainability.

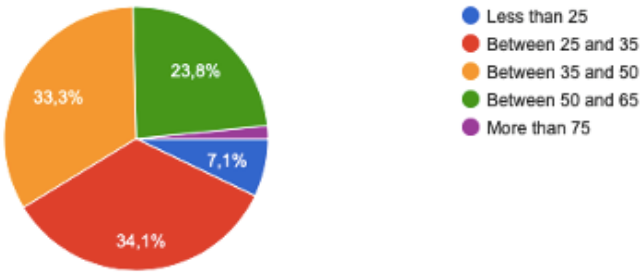
It was created for current wildlife health researchers and/or academics attending the joint WDA/EWDA conference held in September 2021. We asked attendees to fill in the questionnaire prior to the meeting. A summary of the results was presented during the conference. The questionnaire had a total of 40 questions that could be answered in 5-10 minutes. There were 126 respondents.

The questionnaire was divided into 6 sections:

- Respondent profile
- General awareness
- Habits in the lab
- Habits in the office and computer usage
- *In vivo* research
- Field research

The first two sections were obligatory for all respondents, while the last four were only for those respondents to whom they applied.

Figure 1. Age of respondents.



Respondents could answer questions to multiple sections and most respondents answered to the question on field research (92%), with less on office (87%) and lab (79%) work, while the least percentage of respondents answered to the questions on *in vivo* research (28%).

Part 1: respondents' profile

Age: see Figure 1.

Gender: 67,5% of the respondents were female and 30,2% were male.

Years working in research: see Figure 2 (next page).

Type of organisation: the great majority of respondents work in universities (59,5%), and the second most common answer was national bodies for example state laboratories (24%). Other, less common answers, included NGOs, private laboratories, private practice, and zoological institutions.

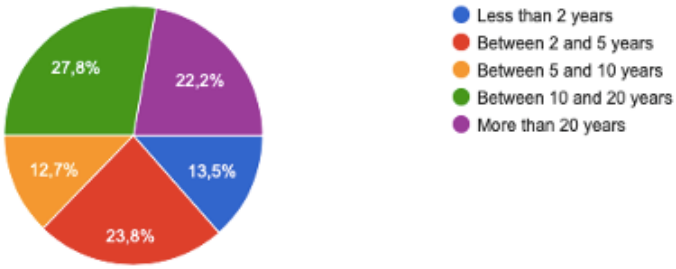
Position: most respondents were either researchers (30%) or PhD/doctoral students (31%). Second to this were academics and licensed veterinarians (separate categories, both 14%).

News from the Sustainability Committee

Part 2: general awareness

Questions in this section were aimed to get to know whether the different institutions raise awareness and take actions regarding sustainability in their workspaces and their different practices. As a result of these questions, we found out that there is a great lack of information given to the staff and/or students of the institutions, as there were a significant percentage of answers stating that they do not know or do not want to answer.

Figure 2. Years working in wildlife health research.



We asked if their organisation had a sustainability or green policy. A great number of respondents (38%) answered they had a sustainability/green policy. Out of these, the majority did not know if the policy was publicly accessible (55%), while a minority, 24% said it was publicly accessible. The respondents were asked to add the name of their organization in case they had a publicly accessible sustainability/green policy.

Those institutions included ADM, APHA, Agencia de Medio Ambiente y Agua de Andalucía, Bioparc Fuengirola/ Fundación Bioparc, CECAV-UTAD, Centre for Fish and Wildlife Health Bern, Complutense University of Madrid, Erasmus MC, GISAZ, George Mason University, Humboldt State University, International Crane Foundation, Istituto Zooprofilattico Sperimentale delle Venezie (IZSVe), National Park Service, UC Davis, Royal Veterinary College, Swedish National Veterinary Institute, The Marine Mammal Center, Universidad Andrés Bello UAB, UCLA, University of Melbourne, University of Nottingham, University of Veterinary Medicine Vienna, Wageningen Bioveterinary Research (WUR), Yukon Government, University of Castilla-La Mancha.

The majority of institutions do not educate their researchers, instructors, students, assistants, and other staff about sustainability in the lab (46%). About one third (28%) did not know or did not answer to this question. Similar results were obtained regarding education about sustainability in the field (44% no, 26% did not know or did not answer). In addition, the majority did not have any initiative to raise awareness about sustainability in the lab (48%).

Part 3: habits in the lab

Our results on working habits in the lab show that most suppliers take back material for recycling (39%), glass is used instead of disposable plastics when possible (51%), chemicals are mostly properly disposed of (89,8%), labs use and maintain a chemical inventory (79%), most workers turn off the devices when not needed (91%), and there is an interlaboratory sharing of equipment, chemicals and/or chemical surplus (67%).

However, there are other aspects of sustainability in the labs that can be improved. For example, most of the respondents stated that there are no efforts towards minimizing the use of chemicals in the lab.

News from the Sustainability Committee

Figure 3. Efforts towards minimizing the use of chemicals

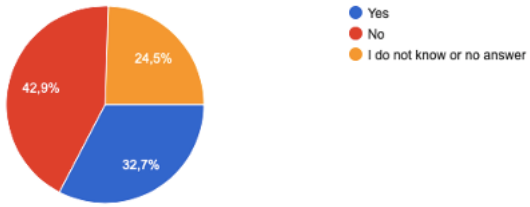


Figure 4. Temperature regulation in labs

Temperature in the labs is normally regulated for the whole building by a certain person (44%); this can lead to loss of energy dedicated to rooms that are empty. Alternatively, the temperature in each room is regulated individually by the people using the room (34%), but it would need to be researched for each individual institution whether this is possible

In terms of incinerator use, there is a big lack of information. The majority of respondents did not know or did not answer to the questions regarding efforts to reduce their input (66%) or the reutilization of the heat generated (69%).

Part 4: habits in the office and computer usage

In this section of the questionnaire, we can see that there is individual consciousness about this problem, but there are no general regulations or guidelines towards better practices.

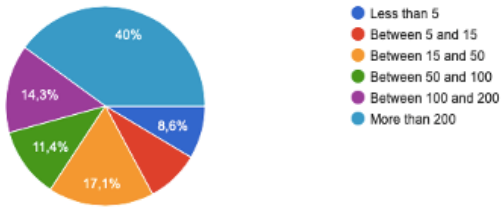
Routers and modems use a high amount of energy. Turning them off at night can make a big change. The results show that mostly routers and modems are not turned off at night (68%). Computers are normally upgraded each 5 to 10 years (45%) and normally recycled when no longer needed (45%). Most users turn off their computers when leaving the office (69%). Research data is mainly stored on hard disks or in the cloud (82 and 73 answers). The devices that are mostly used in offices are laptops, smartphones, desktops, and tablets.

Part 5: *in vivo* research

In this part of the questionnaire, we aimed to learn how much *in vivo* research is performed by the wildlife health research community to appreciate the magnitude in which effective measures could make a difference.

The actual situation varies, but a great number of respondents that have participated in *in vivo* research stated that more than 200 animals were included in their studies in the last 10 years (40%). The answers show that most institutions are making large efforts to reduce the impact of these *in vivo* researches.

Figure 5. In the past 10 years, how many animals in total were included in in vivo studies in the laboratory that you co-authored?

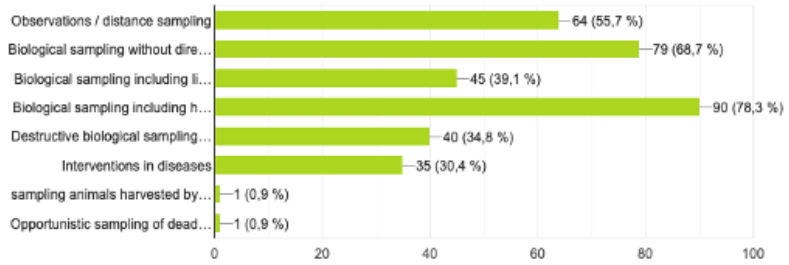


News from the Sustainability Committee

Part 6: field research

The respondents were asked to state which type of research was done in their past studies. Most frequently this was biological sampling including handling and/or anesthetising animals, biological sampling without direct contact with animals (e.g., faeces, urine, hair), and observations/distance sampling.

Figure 6. What type of field research was done in your past studies? Multiple answers possible.



In terms of waste management in the field, a high number of the respondents said that recyclable waste was taken to the nearest urban recycling containers (48%), another 26% stated that the waste was burnt. This situation is complicated by the remoteness of the field sites. In terms of energy use, most sites did not have any source of energy (49%). Some sites obtained energy through gas motors (17%), while others were more sustainable and used solar panels (16%).

Ideas or suggestions on how to reduce the impact on the environment

A selection of responses below:

“Do appropriate, relevant, justified research which has net benefit to the species population or human welfare and economy.”

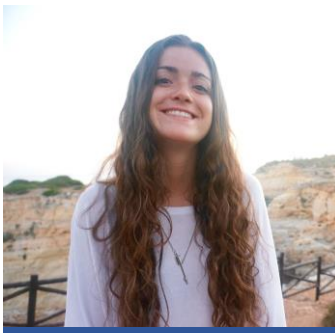
“When working in molecular detection of infectious agents, the waste of gloves and pipette tips is immeasurable. Some kind of technology should provide for improvements in this aspect.”

“Aim to dispel the myth that 'the impact of my small contribution doesn't matter'.”

Conclusions

The results of the questionnaire provided the sustainability committee with a baseline regarding sustainability action taken in wildlife disease research. Although we do not know how representative the results are for the whole community of wildlife health researchers, it will help the sustainability committee to focus their advice on how to make our wildlife research work more sustainable for a group of people that was motivated enough to fill in the questionnaire. We would like to thank all respondents for taking the effort to answer the questionnaire. Questions or comments can be sent to ewda.sustainability@gmail.com.

Beatriz Rubio Alonso, on behalf of the EWDA Sustainability Committee (Lineke Begeman, Thijs Kuiken, Jorge Ramon Lopez Olvera, Graham Smith, Ana Vale, Barbara Vogler).



Beatriz Rubio
Czech University of Life Sciences, Prague, Czechia

News from the Network Committee

"Contribute to the strength of this wildlife health specialist network."

The new WildList is now active since three years. The idea behind the original version was to continue the integration efforts of several former EU projects towards a multinational and multidisciplinary continental network, in order to facilitate collaboration in the field of wildlife health surveillance. In 2018, the original WildList, hosted by the EU WildTech project, was transferred to the EWDA website and was reshaped to a user-friendly format. Since then, anyone involved and strongly interested in any discipline related to wildlife health, can register as a member. It is an open membership, not subject to any specific criteria for admission. Yet the strength of the list is based on the identification of individuals with expertise in specific disciplines of wildlife health, because the main objective is to provide a strong communication tool to track rapidly these specialists, allowing consultation and cooperation.

Simultaneously, with last year's facelift of the EWDA website, minor adaptations were made in the WildList too. At the moment of writing, Wildlist counts 319 subscribers from 48 countries. Focusing on Europe but including also subscriptions from other continents, the list aims to cover a diversity of expertises as broad as possible, with maximal chances for consultants to find the expertises one is looking for. For this reason, the more subscribers, the higher the effectiveness of a search will be. We are convinced that a lot more people involved in wildlife health in Europe are out there somewhere. If you know such people, do not hesitate to refer them to the WildList.

To do a search, go to WildList – European Wildlife Disease Association on the EWDA website. You can fill in any search term related to one of the fields.

The most relevant fields are: name, wildlife species, wildlife diseases, and expertise in other topics related to wildlife health. For privacy reasons, the e-mail addresses and telephone numbers of the subscribers are not displayed, but in the last column you can leave a message that will be forwarded by the system to the person in question, who can reply to you at your e-mail address. The single search field allows you to search all of the different data-containing fields included in the database: all subscribers containing a match with the search term in one of their fields will show up.

By adding your profile to the Wildlist you will contribute to the strength of this wildlife health specialist network. To subscribe, go to: WildList Registration Form – European Wildlife Disease Association. Please update your personal information whenever there are changes; these updates can be done in the same subscription form as for the initial registration. The accuracy of the information included determines the usefulness of the WildList.

News from the Network Committee

A “Wildlist message” containing meeting-, job and other announcements is sent round to the subscribed members on a monthly basis. Although job announcements in the field of wildlife health used to be rather scarce in the past, in the current global context an increasing supply in such announcements can be expected. Therefore we appeal to EWDA members to share any meeting-, position- and other interesting announcements in the broad field of wildlife (One) health you may spot within your networks: use the link on the EWDA website: menu EWDA-network > submenu WildList > 2nd paragraph.

Besides the WildList, the EWDA Network Committee also manages the EWDA Google group (cf. 2021 EWDA Summer Newsletter), and the editing of the Species Cards and Diagnosis Cards available on the EWDA website. Furthermore, meetings focusing on specific aspects of wildlife health surveillance are organized in conjunction with the EWDA conferences. The most recent meeting took place on-line in August 2021, one day before the start of the joint WDA/EWDA digital conference “Cuenca 2021”.

This meeting on “Expanding the field network of wildlife health surveillance” highlighted the opportunities and successful experiences of collaboration with citizens and communities active in different fields related to wildlife health. A first report summarizing the conclusions of the EWDA Network Committee meeting in Larissa (Greece, 2018) on “How to start up a national wildlife health surveillance program” can be found on the EWDA website. Last August, as a final outcome of this meeting, the results were published in the peer reviewed journal "Animals" (open access): https://www.mdpi.com/2076-2615/11/9/2543/htm

Paul Tavernier, on behalf of the EWDA Network Committee (Thijs Kuiken, Becki Lawson, Jorge Ramón López Olvera, Antonio Lavazza, Aleksjia Neimanis).

Paul Tavernier
Wildpad / Belgian Wildlife Disease Society, Belgium

News from the Student Chapter

"Call from the EWDA Student Chapter"

Are you a student and EWDA member? Do you want to get involved in the EWDA's life and activities? If you answered yes to both questions, then do not miss what is below!

Due to the Covid pandemic, the EWDA Student Chapter (SC) was restricted in the type and number of activities we were able to organise, sadly losing visibility among students in many European countries. However, now it is time to rectify that trend and give the opportunity to many European students who are enthusiastic about wildlife to be part of the EWDA family.

To help us spread the word and reach all Europe, we need your help!

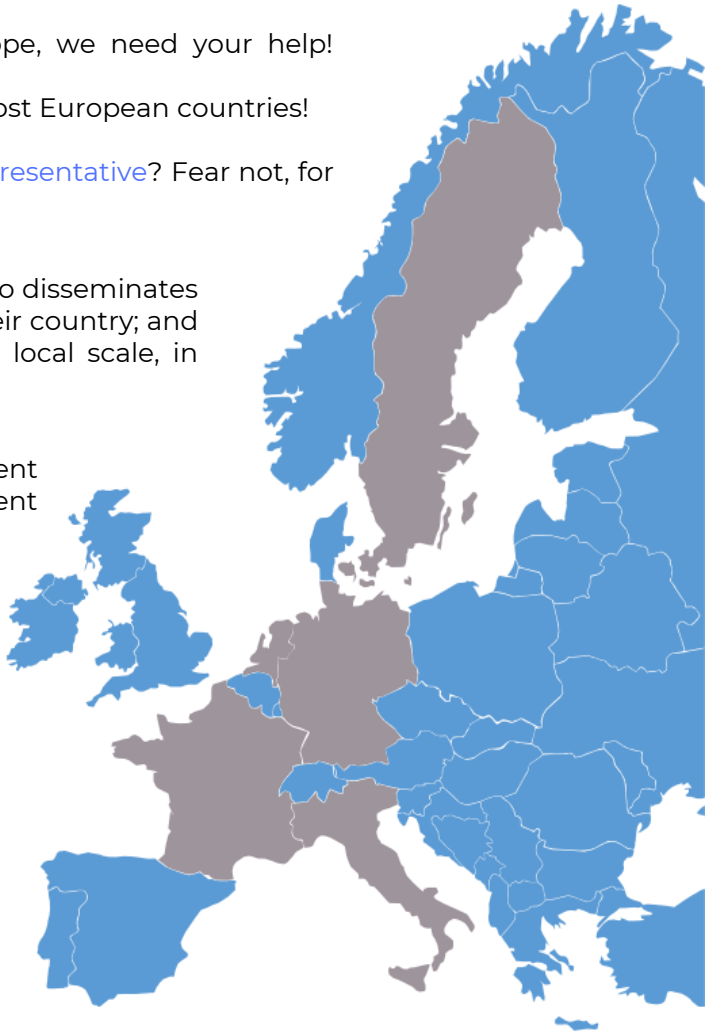
We are looking for country representatives in most European countries!

But what exactly does it mean to be a country representative? Fear not, for we are here to answer that!

A country representative is a volunteer student who disseminates information about the EWDA SC to students in their country; and supports, organises and promotes activities on a local scale, in line with the WDA's objectives and goals.

The position is held for **two years**, and the student will have the help and support from the current EWDA SC board - that's us!

For more information regarding the position and how to apply, please have a look at our website; and if you still have any doubts, feel free to reach out at ewdastudent@gmail.com!



Open positions:

See your country in blue?
That's the spot for you!

Full written out list here

The EWDA Student Chapter (Anna Langguth, Irene Torres Blas, Garyfallenia Tsinopoulou, Loïc Palumbo, Marco Vecchiato).

News from the Nordic Section

"NWDA – virtual biennial meeting 2021"

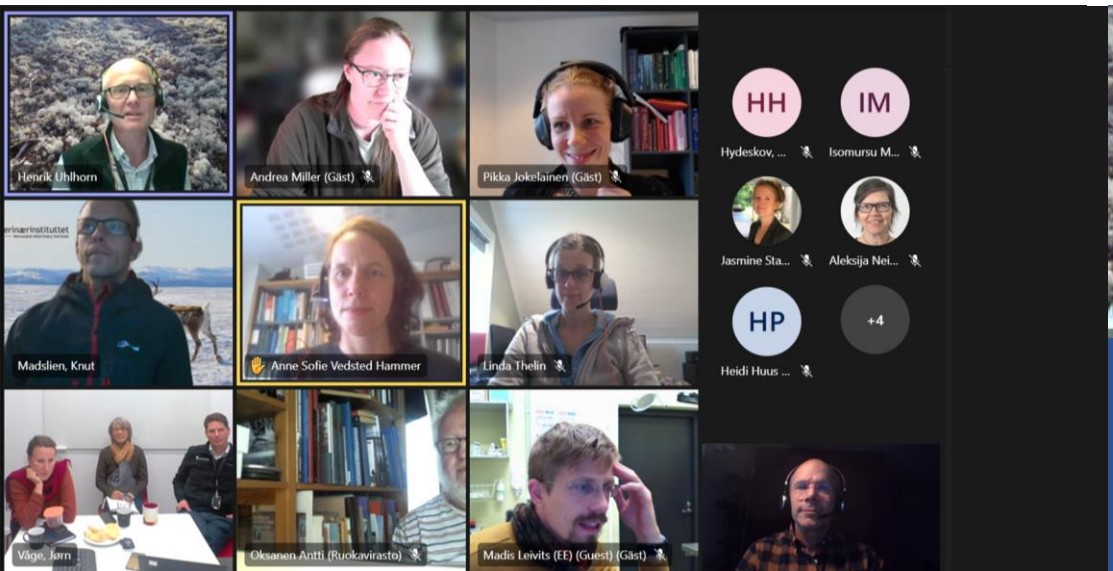
Due to the ongoing pandemic, the 2021 biennial NWDA meeting, instead of a traditional Nordic island-get-together was transformed into a virtual meeting over two half-days on September 15 and 16.

The digital format meeting was hosted by the Swedish National Veterinary Institute and was restricted to a general assembly meeting and short biennial reports by country representatives from Norway, Finland, Denmark, Sweden, and as an extra treat - Estonia, thank you Madis!

Twenty-eight members were able to enjoy presentations of the highlights of current Nordic wildlife health issues and research projects. For most of us, as in the rest of Europe, the last year had been dominated by the deluge of highly pathogenic avian influenza, which is continuing still.

Memorabilia, in addition to reports of avian influenza, included: Denmark reporting from the culling of millions of minks due to SARS-CoV-2; Estonia reporting from the ASF surveillance and of CDV cases in foxes; Finland reporting its first case of myxomatosis, a second case of prion disease in moose and a peak in tularaemia cases in hares; Norway reporting HPAI for the first time(!), a new case of prion disease in a moose, and in a wild reindeer outside the originally infected Nordfjella area, and reaching over 130 000 cervids tested for CWD; Sweden presenting a fourth case of prion disease in a moose, a new surveillance program for marine mammals, a new national screening of Echinococcus multilocularis in red fox, and outbreaks of tularaemia in hares the north and Salmonella Choleraesuis in wild boar in the south.

Finally, Marja Isomursu and the old board was thanked for their dedicated work heading the section and a, at least partly, new board was elected.



Henrik Uhlhorn
Caroline Bröjer
National Veterinary Institute, Uppsala, Sweden

Do Invasive Infectious Diseases Threaten Our Native Amphibians?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"A pilot study on Natterjack toads (*Epidalea calamita*) in Schleswig-Holstein, Germany."

Batrachochythrium dendrobatidis (*Bd*) and *B. salamandrivorans* (*Bsal*) are considered invasive pathogens, spreading rapidly and in parts causing huge damage among amphibian populations (Lips 2016). In Germany, both fungi have been present for several years now. For *Bsal*, Germany counts as the hotspot of its European range, with detections in the Eifel uplands, the Ruhr district and the federal state of Bavaria, covering locations at great distance to one another (Ohst et al. 2013, Dalbeck et al. 2018, Lötters *et al.* 2020). So far, *Bsal* has not been detected in Schleswig-Holstein, where our investigations took place. In contrast, *Bd* has been found in Common toads (*Bufo bufo*) and Fire-bellied toads (*Bombina bombina*) in the northernmost federal state of Germany (Kielgast 2009, Ohst *et al.* 2013).

For our pilot study in spring 2021, we took non-invasive skin swabs from thirty Natterjack toads (*Epidalea calamita*) in three areas within a 30 km range in the rural district of Dithmarschen, Schleswig-Holstein. The samples were pooled in groups of three, while only individuals from the same location were pooled together. The pooled samples were examined for *Bd*, *Bsal*, and Ranaviruses via PCR analysis by LABOKLIN GmbH, a specialist laboratory in Germany. In all three locations, Bd could be found in at least one pooled swab sample. No sample tested positive for *Bsal*, as expected for toads, or Ranaviruses. Since we did not check the genetic lineage, we are not able to say if any of the confirmed cases originated from the "global pandemic line" (*Bd*-GPL) which is considered hypervirulent (Farrer *et al.* 2011). While being manipulated in the field, all amphibians were also checked by veterinarians and did not show any skin lesions or detectable signs of poor condition.

Our findings support the hypothesis that Bd is already widespread within Germany (Ohst *et al.* 2013). For most amphibians, it is not yet clear if they develop clinical chytridiomycosis and are hence threatened by an infection with the fungus. Nevertheless, most amphibians can be either hosts, vectors or reservoirs. Even though none of the examined Natterjack toads showed macroscopical signs of disease, it is possible that some were in early stages of infection. Since we did not test the genetic lineage, the detected fungus might also have been of low virulence. However, we suggest a further monitoring of both invasive fungi to be essential: According to the red list of amphibians in Schleswig-Holstein, eight out of eleven amphibian species are considered rare to extinct (Klinge and Winkler 2019). As their situation is already concerning for manifold reasons, any additional threat via infectious diseases might be critical for the survival of the species.

We would like to acknowledge and thank Ursula Siebert, Stephanie Groß, Patrick Pohlmann, René Seifert, Christoph Leineweber and Rachel E. Marschang.

Simon Rohner, Lotte Striewe
ITAW, Büsum, Germany

Canine distemper virus (CDV) in wildlife in southwestern Europe

CDV belongs to the genus *Morbillivirus (*family *Paramyxoviridae)*. In 2020-21, we recorded mortality due to distemper in four carnivore species including three mustelids (Eurasian badger *Meles meles*, European marten *Martes martes*, and European polecat *Mustela putorius*) and one canid (red fox, *Vulpes vulpes*) in Asturias (northwestern Spain) (Figure 1). Clinical signs and pathology were similar across species and consistent with the emergence of a highly pathogenic viral strain, belonging to the European lineage, with CDV antigen mainly located in the central nervous system (Figure 2), lungs, spleen and lymph nodes. A molecular study in eight wild carnivore species, also including the Iberian wolf (*Canis lupus*), Eurasian brown bear (*Ursus arctos arctos*), American mink (*Neovison vison*) and stone marten (*Martes foina*), revealed 19.51% (16/82) of positivity. A retrospective serosurvey (2008-2020) showed a high seroprevalence of CDV antibodies (43.4%) in 684 analyzed badgers, indicating a long-term though not stable viral circulation in this multi-host community. Previous studies also confirmed CDV antibodies in fox (22%) and wolf (19%) in the region.

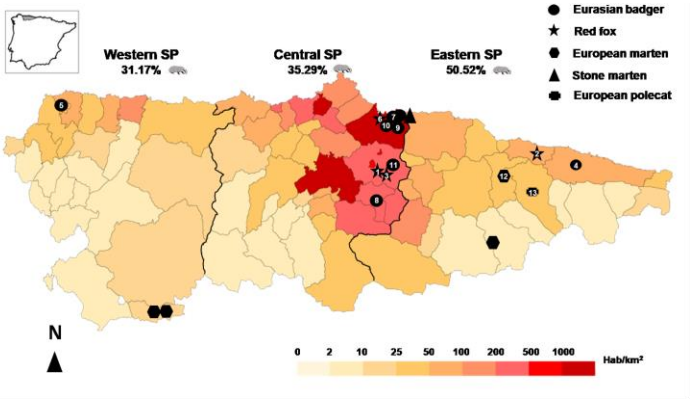

Figure 1. Distribution of wild carnivore species showing clinical distemper (Oleaga *et al*., 2021).

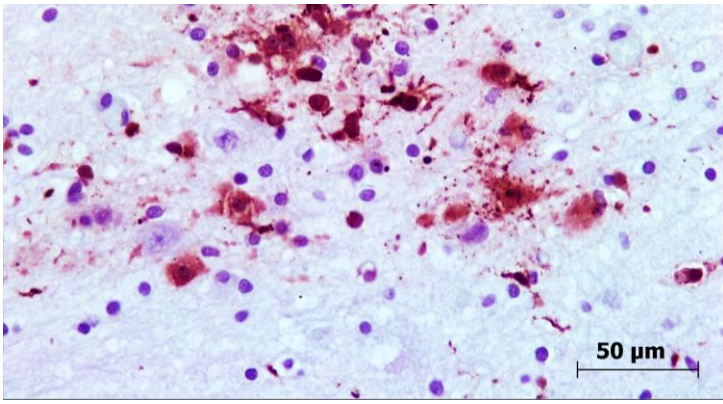

Figure 2. Badger. Positive immunolabelling against CDV in the thalamus.

Results suggest that CDV is well adapted to wildlife in southwestern Europe, with subclinical manifestations in most animals and without severely affecting population dynamics, and with either cycles of increasing population susceptibility coinciding with periodic outbreaks (e.g., in 2020-2021), or sporadic infection spillover events, possibly from unvaccinated domestic dogs. Vaccination of dogs remains as a key preventive measure for the control of this and others domestic-wildlife shared virus circulation, and thus for the indirect protection of sympatric wild carnivores susceptible to those pathogens.

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A. Oleaga[1], C Blanco[2], LJ Royo[2], TD Barral[3], D Bonnaire[4], JA Armenterros[5], B Rabanal[4], C Gortázar[6], Ana Balseiro[4]

[1]SERPA-Spain, [2]SERIDA-Spain, [3]UFB-Brasil, [4]ULE-Spain, [5]Principality of Asturias-Spain, [6]SaBio-IREC-Spain

abalm@unileon.es

Journal of Wildlife Disease

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