



## FELLOWSHIP SUMMARY REPORTS

Name: Adrian Treves

Subject title and number: Evidence-based policy and husbandry interventions for protecting livestock and biodiversity”, Directorate: TAD/CRP Contract: PO 500113056

Host institution: Alfred Toepfer Academy for Nature Conservation

Host collaborator: Dr. Eick von Ruschkowski

Dates: October 2022, August 2023

Consent: I consent to my report being posted on the Co-operative Research Programme’s website.





### 1. What were the objectives of the research project? Why is the research project important?

I had two goals. The first was to launch a gold-standard field experiment on a non-lethal method of protecting Lower Saxony livestock from grey wolves and protect wolves from lethal management. That goal supported my host institution's mission and the Tierschutzgesetz, the German Law protecting both wild and domestic animals from suffering.

My second goal was to conduct 2 training workshops with up to 120 government officials and livestock owners or managers to apply the knowledge from 10 recent, international meta-analyses to the local context. The workshops would provide an opportunity for government agents and private farmers to tailor non-lethal interventions to local conditions, so as to improve the sociopolitical acceptability of wolves and advance important ecological goals.

### 2. Were the objectives of the fellowship achieved?

Or are they on the way to being achieved?

If not, for what reasons? (The data or research is still ongoing or being analysed; technical reasons (e.g. equipment not working, adverse weather conditions, unexpected results, etc.; other reasons?)

*Please note that my fellowship was unusual in that my proposal was initially put on a reserve list and then funded one year later. Therefore, my proposed goals had to adapt to the change in schedule and conditions present one year after I had anticipated beginning the fellowship.*

The goals were achieved in part.

My host institution and I were not successful in raising funds for a randomized, controlled trial of a non-lethal method for protecting livestock, although our efforts remain underway. My collaborator and I have a draft manuscript in preparation, but it is not yet submitted to a peer-reviewed scientific journal. Unexpectedly, I made another contact in Germany who is a co-author on a peer-reviewed publication currently under consideration (Treves, A., I. Khorozyan, Robust inference and errors in studies of wildlife control. Submitted to Scientific Reports, pre-print at Research Square <https://www.researchsquare.com/article/rs-3478813/v1>).

Together, my collaborator and I did achieve the training and outreach goals of the proposal with more than six training workshops and talks at conferences provided to approximately 80 practitioners and researchers in six separate jurisdictions in three countries. Also, I achieved my goals of forming new collaborations and developing new ideas. Indeed, my time in Germany, France, and Italy far exceeded my expectations for these professional goals.

### 3. What were the major achievements of the fellowship? (up to three)

#### Research

Treves, A., I. Khorozyan, Robust inference and errors in studies of wildlife control. Submitted to Scientific Reports, pre-print at Research Square <https://www.researchsquare.com/article/rs-3478813/v1>).

#### Training and outreach to livestock managers, researchers, and conservation practitioners

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#### Strengthened collaborations with European counterparts

I now have collaborators in France and Germany, with upcoming invitations from potential collaborators in Italy, Armenia, and Slovenia.





#### 4. Will there be any follow-up work?

- Is a publication envisaged? Will this be in a journal or a publication? When will it appear?
- Is your fellowship likely to be the start of collaboration between your home institution and your host?
- Is your research likely to result in protected intellectual property, novel products or processes?

See above for collaborations nascent and in progress.

Another manuscript tentatively entitled “Governmental preparedness for wolves” with Dr. Eick von Ruschkowski, my collaborator, is aimed at a peer-reviewed scientific journal and anticipated for submission in early 2024.

#### 5. How might the results of your research project be important for helping develop regional, national or international agro-food, fisheries or forestry policies and, or practices, or be beneficial for society?

Please express this in terms of environmental/food security/food safety/economic/health (human and livestock and plant) benefits, etc.

National food policies and nature conservation policies seek win-win solutions. The non-lethal methods of intervening to protect livestock and protect wolves is a possible example of such a win-win solution. Indeed, from other regions, we have six functionally effective non-lethal control methods to draw upon, so we are not starting from zero. We can adapt and tailor various non-lethal methods of deterrence as the farmers prefer, or offer them other non-lethal methods (e.g., removal of attractants, and improved fencing) that have not yet been subject to gold-standard experimental tests. In short, we expect to end this project with recommended options for how any farmer in Europe might avoid wolf predation on their domestic animals. The policy intervention would then depend on subsidies and government technical support to implement the method widely. Our key role is to ensure that any government policy interventions, subsidies, or investments are backed by strong inference from rigorous field experiments on their functional effectiveness to protect livestock.

#### 6. How was this research relevant to:

- The objectives of the CRP?
- The CRP research theme?

The proposed fellowship engages three CRP priorities in the following order of fit and importance:

1. Ecosystems and biodiversity, including in aquaculture and farmlands, and natural resources
2. Sustainable food systems
3. Resilience and risk management

Within the theme of “MANAGING NATURAL CAPITAL FOR THE FUTURE”, I address the biodiversity sub-theme directly, and also support the sub-themes of Integrated Agricultural Production Systems and Land.

Wolves and other native, large carnivores typically play outsized roles in their ecosystems by suppressing prey such as roe deer, rabbits, large rodents, and other herbivores, and suppressing smaller carnivores such as fox, golden jackal, mink, etc. Top predators such as wolves also create feeding opportunities for smaller animals, including mammalian and avian scavengers. Therefore, top predators play roles disproportionate to their numbers as they tend to be at low densities across ecosystems. That is, they are keystone species, using the formal ecological definition, and keystone species tend to support many interacting species. That seems accurate for wolves because they support diverse scavenger guilds and reduce the effects of herbivores on plant communities.

Not only do top predators control numbers of prey and competitors by killing them but they change the behavior of the survivors that normally outnumber the dead by 9:1. Therefore, theory predicts (and preliminary research results support) that the behavioural effects on survivors may be more powerful than the ecological effects on the prey and competitors killed by top predators.





Those changes in behaviour (and stress physiology) of the animals coexisting with top predators translate into shifts in foraging behaviour towards lower trophic levels (smaller prey or less concentrated herbivory) which has led in some ecosystems to favour the regeneration of vegetation, restoration of biodiversity, increases in populations of native fauna from birds to beavers, insect scavengers to raptors, and small and large predators [58]. Although these and other improvements in ecosystem health, function, and biodiversity do not inevitably occur, the imposition of human-induced lethal control of top predators has been conclusively shown to deplete ecosystem health and diversity in terrestrial and aquatic ecosystems worldwide. Therefore, one would predict that non-lethal management of wolves in European agro-ecosystems might have benefits for nature conservation and ecosystem health as well. Although many of these promising ecological changes and restorations of nature remain hypothetical in the absence of long-term research, many human and nonhuman interests would seem to align to favour non-lethal methods of managing wolves in agro-ecosystems. Finally, reductions in losses of crops and livestock while at the same time conserving biodiversity would help to attain the goals of balancing various human and nonhuman needs within the sub-themes of integrated agricultural production systems and land.

## 7. Satisfaction

- Did your fellowship conform to your expectations?
- Will the OECD Co-operative Research Programme fellowship increase directly or indirectly your career opportunities? Please specify.
- Did you encounter any practical problems?
- Please suggest any improvements in the Fellowship Programme.

I was very satisfied. Please see survey under separate cover.

## 8. Advertising the Co-operative Research Programme

- How did you learn about the Co-operative Research Programme?
- What would you suggest to make it more “visible”?
- Are there any issues you would like to record?

I learned of it from a colleague. In the USA fellowships are often restricted to junior scholars such as post-docs and graduate students so perhaps changing the name to a ‘visiting research grant’ or ‘research stay’ might attract more senior scholars.