INTERVIEW 2: UNIVERSITY

UNI AGRARIA INTERVIEWERS

- **DI NARDO MATTIA**

UNI OFFICES INTERVIEWERS

- **LANGIANO DALILA**
- **PAGLIA FRANCESCA**

QUESTIONS UNI AGRARIA

DI NARDO MATTIA

- What is the ongoing research project of this department that shows the greatest potential to reduce environmental impact in Molise?

QUESTIONS UNI OFFICES

LANGIANO DALILA

- Do you have any active collaborations with companies in Molise to make their production processes more sustainable?
- How can UNIMOL help making these European projects more effective, even considering students and teachers training?

PAGLIA FRANCESCA

- Do you consider relevant the students participation to civic monitoring projects like ASOC?
- In your opinion, what is the role of university in projects such as MAPA combining scientific research, territory and citizens?

UNIMOL DEPARTMENT OF AGRICULTURAL SCIENCES – 19/02/26

PART 1: OPENING PRESENTATION BY PROFESSOR IAFFALDANO

Today I will tell you about what we do here at the University of Molise — a region that receives little attention, yet is rich in initiatives at both national and international level. My name is Nicolaia Iaffaldano, and I teach animal husbandry at this university, a discipline that encompasses agriculture and aquaculture. I would like to mention that, after my opening remarks, you will visit some very interesting laboratories. In our department there are three cryobanks: one for avian breed semen, one for rabbit breed semen, and a European cryobank — the first in Europe — for trout semen, funded with 3 million euros. My current projects include one worth approximately 2 million euros, focused on aquaculture farming, that is, the breeding of fish and molluscs.

The domestic product — sea bass caught or farmed in Italy — is significantly better than the imported product from Greece, because the European regulations we apply in Italy are far stricter. I therefore recommend buying Italian products.

Why did aquaculture come about? It is simple: humans continue to source food from the sea, but wild fish cannot be a continuous supply. Climate change and pollution have led to a reduction in marine fish stocks. Europe therefore funds those who farm fish, producing products comparable in quality to wild catch, but with a lower environmental impact.

When farming sea bass and sea bream in the sea, I use floating cages — such as the 20-metre diameter ones at the Manfredonia farm — and I feed the fish. However, not all the feed is eaten: much of it settles on the seabed, along with the fish excrement. So, even though fish farming effectively meets nutritional needs, its environmental impact must be managed.

Europe asks researchers to deliver quality products with a lower impact. The answer is the **IMTA system**: sponges and sea urchins are farmed around the cages, feeding on the excrement and uneaten feed, thereby cleaning the marine ecosystem. Sponges are also used in cosmetics and pharmaceuticals, and have shown anti-tumour properties. It is a circular economy: what is expelled is recovered.

Sea urchins, at risk of extinction because they are widely consumed by humans, are also being safeguarded through a cryobank. We have also implemented smart monitoring systems to continuously track environmental parameters and fish welfare, since European projects require the safeguarding of product quality, animal welfare, and responsiveness to climate change.

PART 2: THE NAT.SAL.MO PROJECT

I would like to introduce Emanuele Antenucci, a researcher who works with me: in the laboratory he will show you the cryobank. I will now tell you about topics that are not often discussed openly — including a comparison between mammalian sperm and trout sperm.
This cryobank was established in response to a European **LIFE** funding call, which provided 3 million euros with the involvement of nine partners, including European ones. Its purpose is to protect biodiversity, safeguard habitats, and respond to climate change — core themes

of the European **Green Deal**, a political strategy aimed at transforming the EU into a more sustainable economy. Protecting biodiversity means having healthy ecosystems and ensuring ecosystem services such as food production, air purification, and climate regulation.
Why is biodiversity being lost? Climate change, river pollution, deforestation, dam construction, and the introduction of non-native species. How can it be protected? Through *in situ* conservation (protecting the natural habitat), *ex situ in vivo* conservation (relocating animals to suitable alternative environments), and semen cryobanks: sperm is preserved at −196° in liquid nitrogen, a technique known as *ex situ in vitro*.
Let us now focus on the trout. How long does a mammalian sperm cell survive? Generally 48 hours, and the most resilient up to 72. For trout it is different: fertilisation is external, not internal as in mammals. In nature, the female travels long distances to find the most suitable spot to lay her eggs, digs in the gravel with her tail, deposits the eggs, and the males fertilise them. She then covers the eggs with gravel, and the fry will hatch from there.
The project is called **NatSalmo** — Nat for native, Sal for salmon (since trout is a salmonid), Mo for Molise — and its aim is to protect the native trout of the Biferno and Volturno rivers. The Mediterranean trout is a species endemic to the Mediterranean area, listed on the **Red List** of species at risk of extinction.
The main causes: river pollution (waste, industrial discharge), introduction of non-native species that hybridise with native ones and alter the genetic heritage, poorly regulated fishing, and obstructions in watercourses. We also discovered that males and females are not always synchronised in their reproductive cycle: when the female is ready, the male is not, and vice versa. The cryobank solves this problem: the semen is always available.
The trout is an **indicator of river health**: where native trout are present, the water is clean. Its reproductive cycle runs from January to March, at temperatures between 10° and 17°C.
The cryobank holds **2,091 semen doses** from **161 native donors**, all genetically characterised to confirm they are fully native. The females' eggs are divided into aliquots and each fertilised with semen from a different male — identified by the colour of the straw — in order to increase genetic variability, reduce inbreeding, and make the trout more resilient.
For field fertilisation, females were collected from the river using electrofishing, the aliquots were prepared, the semen was thawed, and the eggs were fertilised. Each straw contains 750 million sperm cells. The fertilised eggs were then taken to adoption hatcheries (Biferno River at Guardiaregia, Volturno River at Rocchetta al Volturno) at 10°C with a continuous water flow, for 45 days until hatching. Why 10°C? Because higher temperatures accelerate metabolism and increase the number of embryos that fail to develop fully.
The eggs close to hatching — rather than larval stages — were then seeded into artificial gravel nests in the river, replicating the natural behaviour of the female. This is because fish raised in captivity become accustomed to humans and artificial food, and would be easily predated in the wild.

Results: 305,000 eggs fertilised using frozen semen. The increase in Mediterranean trout populations in the project areas was **70–94%** compared to previous levels. The project has become a **transferable model for Europe**, recognised at the international congress in Prague. It was broadcast on Rai 1, Rai 2, and Rai 3.

Question by Nicola Marraffino (student) : Can you eat river trout?

So, it's not hygienic — and it's not good, it can be — because we've seen that everything ends up in rivers. That's why it's important to preserve our river and marine ecosystems: precisely to avoid this. But fish, if the ecosystem where it lives and grows is good, can be eaten. Of course, if we are protecting a native species like this, we don't go and catch it: we are trying to increase its numbers. But many years ago, your grandparents and great-grandparents certainly went to the river and ate fish, because conditions were good, i.e. the river was healthy compared to what we have now. That's why I said earlier that trout is an indicator fish. Where the water is clean, there are native trout, because they are demanding fish that need clean water. And if there are native trout, it means that the water is clean — which also means that we are healthy. It's the same thing: ecosystems are connected. That's why environmental education is essential.

[Question about the project]

The trout spawning ground was located right in the Bojano area, where unfortunately dairy industry discharge and waste of all kinds are dumped. We also hypothesised that urban wastewater containing contraceptives was blocking reproduction at certain sites.
The project involved many activities: restoration and cleaning of the Biferno and Volturno riverbeds, construction of fish passes to overcome dams, and environmental education in schools — including a mural of the Mediterranean trout at the Jovine primary school. Legambiente also contributed to public outreach. A **River Contract** was established, involving all the institutions connected to the rivers, and was signed first by the Molise Region.
Obtaining funding is not simple: you submit 10 projects to have one funded. What gratifies me is finding the funds that allow me to carry out research and to support the young researchers who work with me — and contact with young people is what drives me to keep going. We are resilient too, just like the trout.

Right now, we are trying to get some other projects off the ground to continue the work we did before. Getting funding, guys, even though I make it sound so easy, is not easy at all. Ten projects are submitted for every one that gets funded. So it's not easy, and it takes a lot of work. What I do is find funding that not only helps us continue our research, but also helps all the young people who work with me, who are all involved in the project. The bigger the project, the better off they are — and the healthier they are. This, in addition to giving me enormous satisfaction, is what gratifies me greatly, along with doing what I am doing today with you young people. Because I really enjoy contact with young people, and that's what makes me want to continue doing research. Contact with the young people who work with me. At least that way, when I retire, I'll leave something for them for the future. Because I believed in it, and I want them to believe in it too.

The difficulties involved in carrying out a project are endless: first of all, to obtain it, because the European Commission does not just give you money, it does not give you millions of euros just like that. They also do a thorough job, both on the technical research side and on

the financial side. So often we research professors are forced to deal with the financial side, the reporting, and this takes away time that we could devote to finding other sources of funding. But let's say that we are resilient too, like trout.

As part of our project, we also carried out awareness-raising activities. Yes, I spoke a lot in schools. At the “Jovine” school — the Jovine primary school — there is a mural depicting the Mediterranean trout. Legambiente was also one of the partners in the project and worked with me on the dissemination side. We raised awareness both locally and outside the region, nationally and, above all, in Europe, because we took these things to other European countries to share what had been done here in Molise. In Molise — but where is Molise? What is it? I'll show you where it is because people don't know us.

QUESTION BY DI NARDO MATTIA (Student)

What is the ongoing research project of this department that shows the greatest potential to reduce environmental impact in Molise?

PROF.SSA IAFFALDANO NICOLAIA

Thank you very much for your CEU. The greatest project was L’Arche d’Amazon. It is a European project, and we created the first European single bank of native deep trout in rivers, and we are very satisfied. Three frozen seamen were used for reef docking in this very simple avatim, an agricultural project. This project is starting, and the results will be shown next year. I intend to show these results in the project.

UNIMOL INTERVIEW DEPARTMENT OF ECONOMICS 02/19/26

OPENCOESION PROJECT CLASS 3A AFM

INTERVIEWED

- Oppido Simone (PhD student in Law and Economics - UNIMOL)

PART 1: LANGIANO DALILA

LANGIANO DALILA (Student)

Have any active collaboration with company Molise to make their production process more sustainable?

OPPIDO SIMONE

Yes. The University of Molise has developed several collaborations with companies based, yes, the University of Molise has developed several collaborations with companies based Molise aimed at improving the sustainability of their production processes. These collaborations mainly involve small and medium sized enterprises operated in sectors such as AgriFood, tourism, and other economic sectors.

LANGIANO DALILA

How can Unimol help making help making this European project more effective? Even considering teachers and students training,

OPPIDO SIMONE

Unimol can make European projects more effective by straightening the integration between research, education, and local stakeholders. Firstly, it can contribute strong methodological expertise in project design, monitoring and impact evaluation, improving the overall quality and sustainability of funded initiatives. Second, it can promote targeted training for students and teachers on topics such as sustainability, open data analysis, digital tools, and European project management.

LANGIANO DALILA

Thank you.

PART 2: PAGLIA FRANCESCA

PAGLIA FRANCESCA (Student)

Do you consider relevant the students participation on the monitoring project like ASOC?

OPPIDO SIMONE

Students participation on civic monitoring project such as ACOC is extremely relevant. These initiatives help young people understand how public policies and European cohesion funds work in practice beyond technical skills. In that analysis and research, students develop critical thinking, civic awareness, and a stronger sense of responsibility toward their territory.

PAGLIA FRANCESCA

In your opinion, what is the role of university in project such as MAPA?

OPPIDO SIMONE

In projects such as MAPA funded under the Interregional Italy-Croatia Programme? The role of the university strategic. It ensures the scientific rigor in environmental monitoring that analysis and impact assessments, while also translating complex research results into

accessible knowledge for public authorities and local communities. University act as a connectors between scientific research, territorial development, and scientific engagement. International projects involving both Italy and Croatia. They also facilitate institutional dialogue and the knowledge exchange.

PAGLIA FRANCESCA

Thank you.

OPPIDO SIMONE

You're welcome.