February 2021

BIDR
The French Associates Institute for Agriculture and Biotechnology of Drylands (FAAB)

From the Director

It is almost unbelievable, but we have been living with the pandemic for over a year now. Another semester of teaching online has just ended, and I think we have overcome many barriers and made great improvements in this platform. Although the vaccines are already making an impact and, on our campus, the situation is pretty good, I ask that you all continue to keep the rules so we can maintain our problematic but still valuable routine.

Recently we have been experiencing problems in the continuity and quality of the power supply. There are a number of reasons for this related to the electric company and also to our campus’s infrastructure. I know that power supply disruptions severely hamper research, as well as teaching. I advise each one of you to include an appropriate UPS device in any important system. In case the UPS device breaks down, please bring it to the institute’s administrative assistants so that it can be sent for inspection. Please turn off any electrical appliance before leaving for the weekend and even remove the plug from the socket. Especially during the rainy season, there may be power surges that are very harmful to electrical appliances. We recently conducted a successful pilot test of temperature control in the growth rooms and refrigerators inside the institute building. In case of power failure and temperature changes, the system sends alerts to email. If you are interested in connecting your infrastructure to the system, please contact the institute’s secretary.

As you will see below in the newsletter, the institute’s researchers are very active and have been successful in obtaining research grants. Recently, the institute’s researchers have submitted a large number of grant proposals, and I hope that a significant portion of the applications will be accepted. I believe that our excellence begins with submissions to competitive funds that enable basic research. At the same time, it is clear that the institute’s researchers also collaborate with commercial companies in studies with an applicative nature. This is certainly a great way to influence food production relatively quickly and effectively.

Obtaining grants is very important in fulfilling our institute’s mission: developing agrotechnologies and biotechnologies for increasing arid zone food production while protecting the environment.

Stay healthy and safe, and do fruitful research,
Naftali

Meet the Student

Isaac Yagle
My name is Isaac Yagle, and I am a PhD student in Dr. Ilya Gelfand’s group of Environmental Biogeochemistry. I come from Lawra, a small community located in the savanna grassland of the northwestern region of Ghana, on the border with Burkina Faso.

I received my B.Sc. degree in Ghana from the University of Development Studies, and I came to Israel in October 2018 for my master’s degree in environmental biogeochemistry in the field of Desert Studies under the supervision of Dr. Ilya Gelfand and Dr. Michal Segoli. During my master’s study, my advisors introduced me to the entirely new and fascinating world of nitrogen (N) cycling in dryland ecosystems, as well as a new methodology to study it. In our lab, we measure in-field emissions of soil N oxides (N2O and NO) using state-of-the-art laser-based technology. We also estimate soil N transformations using standard laboratory-based techniques. During my master’s research, we have explored the effects of the summer-flourishing Salsola plant on the soil N cycle and soil N oxide emissions, and we found that patches of Salsola plants in the Negev Desert enhance soil N oxide emissions and microbial N transformations in soils.

During my master’s study, I was blessed to receive the interdisciplinary scholarship funded by the Kreitman School of Advanced Graduate Studies, the 2018-2019 Excellence Award for Master’s Studies (cum laude), and the 2019-2020 French Associates Institute for Agriculture Biotechnology of Drylands Scholarship for Excellence. These scholarships have motivated me to work even harder everyday towards contributing something new to science. Currently, I am a PhD candidate with Dr. Ilya Gelfand, studying the N cycle in soils under invasive Prosopis species on the shore of the Dead Sea. Also, I am a recipient of the High-tech, Bio-tech and Chemo-tech Scholarship funded by the Kreitman School of Advanced Graduate Studies.
Barak’s lab at the Sede Boqer Campus, conducting research into epigenetic regulation under abiotic stresses in Arabidopsis. In 2018, Beery became an assistant researcher in the same institute, managing the labs of Dr. Vered Tzin and Prof. Simon Barak, becoming a specialist in bioinformatics, working on expression in plants, under biotic and abiotic stress.

### Upcoming Seminars

**3/3 Itay Cohen** postdoctoral scholar at Prof. Shimon Rachmilevitch lab,  
**Title:** Crops under climate change

**10/3 Chao Song**, a Ph.D. candidate under the supervision of Prof. Aaron Fait  
**Title:** Tomato tolerance to salinity as affected by rootstock origin.

**17/3 Nir Sade**, TAU  
**Title:** Root plasma membrane aquaporins regulate root hydraulics, shoot gas exchange and plant growth.

### Projects, Prizes and Fellowships

#### Israel-Italy MOST Project

Prof. Inna Khozin-Goldberg  
A new collaborative project has been funded between Inna Khozin-Goldberg (Microalgal Biotechnology Laboratory, FAAB) and Prof. Aleberto Bertucco (University of Padova) in the framework of Israeli-Italian Scientific & Technological Cooperation in the field of Green Chemistry and Development of Novel Environment Friendly Materials. The project will explore the ability of some cyanobacteria to fix atmospheric nitrogen into a nitrogen/carbon reserve polymer (cyanophycin). This polymer is of high biotechnological interest that can be used for the production of industrially relevant bio-polymers and amino acids. Biotechnological (genetic modification) and process-engineering tools will be used to enhance cyanophycin content. The project is funded at 398,000 NIS for two years.

#### A new collaboration agreement between Microalgal Biotechnology Lab BGU and an Israeli-German start up

A collaboration agreement has been signed between the Microalgal Biotechnology Lab and an Israeli-German start-up Algalife (https://www.alga-life.com/). The team will explore the potential of microalgae as sustainable, natural, and healthy pigments and fibers in the textile industry.

#### Multidisciplinary research between the Faculty of Engineering Sciences and BIDR

**Project:** Developing deep learning algorithms for climate and environmental issues  
Prof. Arnon Karnieli (PI BIDR), Prof. Mark Last (PI Engineering)  
This project will focus on modeling precipitation in an eastern Mediterranean. Model inputs will include geopotential height, wind, vorticity, cloud water content, temperature, and specific humidity, each at several atmospheric pressure levels, acquired from the Copernicus ERA5 Reanalysis program. A time-based train-test split of the input data will be used for evaluating model accuracy.

#### Collaboration with Carmel Mizrachi Wineries

In Cabernet Sauvignon, Merlot, and other important wines, high levels of methoxypyrazines, MPs, can “degrade” the wine from a very high series (180 NIS per bottle) to a medium series (70 NIS per bottle). Environment-plant interaction is the main factor in this loss in quality. In an integrated omics approach, encompassing broad qualitative and quantitative changes in
metabolites, gene expression, and climate, the Fait lab, in collaboration with Carmel Mizrahi Wineries, aims to identify key regulators of MP biosynthesis.

ICA

**project: Microalgal by-product as a thrapeutant & feed supplement for aquaculture**

Prof. Inna Khozin-Goldberg and Prof. Dina Zilberg

This study will continue to explore the utilizing residue from microalgal production to promote fish health in aquaculture. The microalgae, grown as a source of bioactive compounds for human consumption are only partially utilized and large amounts of protein, fatty acids, etc. remain. Utilizing the residue is both sustainable and economically-viable. The budget received will be used to build a large-scale experimental system for trials with food fish.

Budget: 87,000 NIS

**Scholarship from Haifa LTD (formerly Haifa Chemicals)**

Thanks to the scholarship from the Haifa group, Elided Lumor, Dr. Ilya Gelfand's student, is studying the effect of incremental fertilization levels on soil trace gas emissions. Elided measures soil fluxes of water, methane, and nitrogen oxides simultaneously in a carrot field in Kibbutz Urin using state-of-the-art laser-based instruments. Elided's preliminary results indicate that a) the current application level of fertilizers is at least two times that required by the crop, and b) currently, we are overestimating N trace gas emissions from carrot crops.

**Manuscript of the Month**

**Temperature Shift Between Vineyards Modulates Berry Phenology and Primary Metabolism in a Varietal Collection of Wine Grapevine**

Prof. Nurit Agam and Prof. Aaron Fait

Kelem Gashu joined the Fait laboratory in March 2017 following an MSc from the Faculty of Agriculture (HUJI) in Israel and receiving the Molcho Research Award (Feb 2017) for achievements in studies. During his MSc, he published a scientific paper in *Agronomy* about the fertilization of the super-crop Tef. At the FAAB, his PhD, under the supervision of Prof. Fait and Prof. Agam, focuses on grapevine varietal biodiversity.

In a first article (Gashu et al., 2020; published in FIPS), Kelem describes the phenological variability of 30 different wine grapevine varieties grown at two sites in the Negev plateau and the effects of consistent temperature shifts on berry development. His work has attracted significant attention from the scientific community for its novelty and from the industry challenged by the prospective increase in temperature in wine-growing regions due to climate change.

During his PhD, Kelem has mastered complex techniques such as metabolite profiling, mass spectrometry data analysis, network analysis, and multivariate statistics. Soon Kelem will submit another study to *Plant Cell Environment* on the GXE modulation of carotenoid metabolism and oxidative processes in the berries of 10 commercial white wine grapevine varieties from the collection. A third study is being prepared in collaboration with Michal Shamir from the Volcani Institute on polyphenol regulation in 20 red wine grapevine varieties. Kelem also co-authored a *Nature Biotechnology* paper on a mass spectrometry-based automated analysis of a metabolomics dataset.

Kelem presented is his research in the DDD 2020 Conference, [watch here](#)

Full article

**Institute's Manuscripts Oct-Dec 2020**

FAAB researchers published a total of 22 manuscripts between October and December 2020

[List of manuscripts](#)
Open Positions

**Tenure-Track Position in Remote Sensing**

From the Press

Desert viticulture @BIDR-BGU on Maker Faire Rome
Prof. Aaron Fait on Maker Faire Rome

Watch now

World Food Day 2020: A Message from Nobel Food Prize Laureate Dr. Rattan Lal

Watch now

Pictures from the Institute

Salicornia/Sarcocornia cultivation
Prof. Moshe Sagi and his lab members Dr Dominic Standing and Mr. Tesfaye asmare
Pictures were taken by Dr Dominic Standing
A Glimpse into the Tzin lab-
Chemical Ecology of Plant-Insect Interaction

Previous Newsletters

Sep 2020
Oct 2020