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Кристина Мурджова: Beyond Standard Solutions, or Why Successful Biological Protection is Built on Accurate Diagnosis, the Right Strategy, and Agronomic Expertise

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On January 16, the professional community marked a truly significant event – 130 years since the establishment of professional plant protection in Bulgaria. Historically, we see a huge evolution – from purely regulated solutions for combating a specific pest, today the sector is tasked with much more global objectives – from addressing climate change to preserving biodiversity.

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A little-known fact is that integrated plant protection, including biological plant protection, is not a recent discovery from the years when agriculture has been under constant conditions of increasing climatic and pathogenic pressure, but was a key part of the strategy for healthy soils and orchards in Bulgarian agriculture 30-40 years ago. During this period, Bulgaria occupied one of the first places in Europe in the application of integrated plant protection – on about 1 million decares of vineyards; on hundreds of thousands of decares of orchards; on several million decares of cereal crops; on about 300,000 decares of tobacco; jointly with biological control in all greenhouse complexes in the country.

Today, when the sector faces unprecedented temperature anomalies and new pathogenic threats, the need to use these sustainable practices is greater than ever. To discuss the modern challenges for farmers, we speak with Kristina Murdzheva – Executive Director of the National Association for Biological Plant Protection, Organic Fertilizers and Innovative Technologies (NABPOFIT) and agronomist at *Amititsa Ltd.

In the following lines, she describes the key mission of the Association in implementing innovations and shares invaluable professional experience for overcoming abiotic stress in plants. A special focus in the conversation is biological protection and dealing with one of the most dangerous pests in fruit growing in recent years – the peach tree borer (Capnodis tenebrionis L.). Ms. Murdzheva is adamant that successful control of this “visible-invisible enemy” can be achieved through entomopathogenic nematodes only when based on in-depth entomological knowledge of the pest and accurate field diagnosis, proving that there is no place for template solutions in modern agriculture.

Ms. Murdzheva, how do you think the role of plant protection has changed in the modern world and why is it already a fundamental factor, not only for business, but also for ecosystems and food security as a whole?

In recent years, a number of climate-related changes have been observed – sharp temperature fluctuations, high amplitudes and late frosts. These factors necessitate a new perspective on modern plant protection, and concepts such as sustainability are becoming an integral part of agriculture. That is why food security is linked to higher plant resilience and their adaptability to abiotic stress. Understanding and focusing efforts on creating healthy and strong plants is key to a good yield.

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Today, when agriculture is under serious climatic and pathogenic pressure, how does the National Association for Biological Plant Protection, Organic Fertilizers and Innovative Technologies (NABPOFIT) work to introduce sustainable practices?

NABPOFIT's efforts are focused on seeking innovative technologies for various crops to deal with abiotic stress, new quarantine pests, etc. Plant protection products, including biological ones, are not a panacea – their correct use and knowledge is what is leading and is the basis for the development of agriculture and its adaptation to current conditions. The National Association for Biological Plant Protection, Organic Fertilizers and Innovative Technologies participates in various forums where it shares the latest achievements of its partners and members.

The celebration of the 130th anniversary of plant protection brought together the leadership of the Ministry of Agriculture and Food, the Bulgarian Food Safety Agency, as well as representatives of the scientific community from the Agricultural University and the University of Forestry. Do you already see a real, working dialogue between the state administration, science and branch organizations when it comes to innovations in agriculture?

It can be said that such a dialogue exists, but it is still far from our desire for everything to work in sync. This is somewhat understandable, given the various limitations from legislation, the budget in the agricultural sector, but science also remains aloof from the end user – the producer. Despite efforts by universities and research institutes to implement innovations, this happens at a slower pace than necessary. Of course, there are also units and centers that make significant efforts and develop specific models in the application of complete technologies or testing products to benefit the agricultural industry. Unfortunately, farmers themselves rarely take advantage of scientific achievements in practice.

During the celebrations, you gave a lecture dedicated to one of the biggest problems for fruit growing in recent years – the pest peach tree borer (Capnodis tenebrionis L.). What makes this pest, which you defined as a “visible and invisible enemy,” so insidious for orchards and why do farmers often notice the damage only when it is already too late?

Yes, in the last 1-2 years, more and more has been said about this problem, a National Program for pest control was even created, and there is already a specific state budget for combating the pest.

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The main damage is caused by the larva, which we notice only when the trees begin to dry out and the first completely dried tree is uprooted. Initially, growers attribute this to disease or lack of moisture – especially in non-irrigated orchards. During this time, the larvae develop undisturbed, damaging the root system by boring galleries. This cannot be seen immediately due to the hidden lifestyle of this insect; moreover, treatments for economically significant pests are usually carried out during the growing season and mainly with contact insecticides.

For a long time, many growers relied mainly on chemical preparations, hoping this would solve the problem with the dangerous pest. However, your analysis categorically shows that this no longer works against the peach tree borer. Why are chemical treatments proving insufficient and is an entirely new structure of control, based on the entomology of the pest, necessary?

This applies not only to the peach tree borer, but to all other pests. To successfully carry out a control measure, it is necessary to know the “enemy” in order to know when to attack it and with what. In the course of modern ecological practices, plant protection products, particularly insecticides applied during the growing season, have a contact action. Even this control presupposes specific knowledge such as the use of pheromone traps, monitoring flight, etc., to maximize the effectiveness of such application. Solutions must be comprehensive to break the pest's development cycle – controlling larvae, as well as controlling adults during the growing season.

Present the biological control of the pest Capnodis tenebrionis L. using entomopathogenic nematodes. Could you explain in accessible language for our audience exactly how these nematodes work in the soil and why they reach places where standard insecticides fail?

Entomopathogenic nematodes are an extremely effective method for dealing with larval stages. Most standard soil insecticides must come into contact with the pest or be ingested by it to work. They themselves are not mobile, do not distribute evenly upon application, and degrade. On the other hand, the nematode moves and seeks the larva – it enters it through various openings, releases bacteria that kill it, and feeds on its tissue.

Another very important focus of the prevention strategy in the fight against the peach tree borer by the company Amititsa, where you are part of the team, is through

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reducing stress in plants. We know that climatic anomalies and drought are already a daily reality, and they act as a catalyst for attacks by the dangerous pest. What specific measures does the technology for reducing this abiotic stress and maintaining the optimal physiological status of the trees include?

We use a lot of organic matter and microorganisms, as well as various products that have proven their undeniable effect under high temperatures and stress. The Stop Stress technology of BTU Center has a positive effect on reducing transpiration and optimizing nutritional processes. Another product like Liposam, which is a sticker and can be combined with various plant protection and nutrition products, helps retain moisture in plants at temperatures up to 50°C. Here we are not talking about something miraculous, but about well-chosen products, with precise technology, where each one complements and helps increase the effectiveness of the other.

Of course, biological protection does not completely exclude chemical protection, but rather builds upon it through the integrated use of plant protection products. How is this delicate synchrony achieved – using permitted chemical products without killing the beneficial biological agents and without harming the ecosystem?

People rely on the effectiveness of chemical products because they have used them for a long time and it gives them peace of mind. On the other hand, biological plant protection is, in most cases, even easier to apply, as there is no need to rotate active substances, the products spare pollinators and have absent or minimal pre-harvest intervals. It is difficult to synchronize the two approaches because biological agents are in most cases not spared by chemical preparations, but it is not impossible. It is all a matter of correct strategy and agronomic experience.

Experts from NABPOFIT send a very important warning to growers – even if they have the most effective preparations and biological agents, their application should never be templated. Every orchard, every farm has its own microclimate, soil characteristics, and its own history of pest attacks. This makes universal solutions not just ineffective, but sometimes risky for the farmer. Why is professional consultation and correct field diagnosis by an experienced agronomist the only guarantee that the investment in plant protection will translate into a truly protected and productive orchard?

There is no way to deal with an “enemy” that you do not know well. Often the symptoms are similar and it is difficult to give a definitive answer. It is essential to make the correct diagnosis to

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assess whether a treatment at a given time is appropriate or not. Biological products work to improve the resistance of the plants themselves, the so-called prevention, part of which is also proper nutrition. And success always lies in balance. After all, let's not forget that when we talk about professional crop cultivation, but even hobby gardening, every treatment must be economically justified. That is exactly what profitability and professionalism are about. When we get sick, we seek a doctor, not advice on social media; we need tests by professionals. The same applies in plant protection.

We conclude our conversation where we started – with the 130-year history of plant protection in our country. A history that proves that success lies at the intersection of scientific expertise and innovative technologies. This is also the path along which the Association continues to lead the professional agricultural community today. As Executive Director of NABPOFIT, what would you advise Bulgarian farmers who are about to face the growing climatic and pathogenic challenges in the upcoming season?

Farmers need to inform themselves and gain knowledge from the experience of proven professionals in the field. The challenges are increasing and every wrong step can lead to serious consequences. The success and survival of agricultural holdings in this environment increasingly depends on their ability to calculate risk. One must work with strategy and reason, with a clear vision and goal for the result.

Yes, when you have a factory under the sky, it is difficult to foresee all external factors, but I can assure them that there are working solutions to minimize damage and create the best possible conditions in the surrounding reality.

НАЦИОНАЛНА АСОЦИАЦИЯ
за биологична растителна защита,
органични торове и иновативни технологии

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* AMITITSA will be part of BATA AGRO 2026, which will be held from June 1 to 5 in Stara Zagora. During the exhibition, the company will welcome agricultural producers, agronomists, partners and contractors in Zone 4, where solutions for plant protection, fertilization, biostimulation and improving soil health will be presented.

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