

Biophysical treatment of hatching eggs – from experimental testing to industrial-scale application.

Can a biophysical treatment applied only once, before incubation, influence chick performance throughout the entire growing cycle? Two successive trials — the first on approximately 1,200 eggs and the second on an industrial batch of about 22,000 — point in the same direction: lower mortality, greater flock uniformity, and improved growth. The treatment introduces no substance into the egg and does not alter the farm's technological workflow.

How it works

The BTGP — Bio Top Growth Performance research program, coordinated by Bio Top Romania Agricultural Cooperative (www.biotopromania.ro), under the auspices of the “Gheorghe Ionescu-Șișești” Academy of Agricultural and Forestry Sciences (ASAS) and the University of Agronomic Sciences and Veterinary Medicine of Bucharest (USAMV), studies the effects of biophysical treatments applied to biological material before the production cycle begins. In the poultry sector, hatching eggs are subjected to controlled exposure to electromagnetic fields before being placed in the incubator. The fields increase the permeability of cell membranes and proteins, with effects developing along five pathways: enzymatic and metabolic activation, improved hatchability, stimulated vascularisation and absorption, greater stress tolerance, and reduced pathogen load on the eggshell.

The effects are measured using standard indicators: viability, mortality, growth rate, final body weight, and slaughter yield.

What we aim to achieve

- ✓ reduce mortality and biological losses, including carcass condemnations at slaughter;
- ✓ increase resilience to heat stress and stocking stress;
- ✓ enhance embryonic and chick metabolism by improving feed conversion;
- ✓ increase productivity under real commercial farming conditions.

All results are evaluated on poultry farms and, upon request, replicated at multiple locations to confirm the observed effects.

The first trial: the signal

The first poultry trial was conducted in Buzău County on approximately 1,200 biophysically treated eggs, which yielded about 1,000 chicks raised in parallel with a control group.

Indicators	Treated group	Control group	Difference
Average body weight	2.805 kg	2.775 kg	+1.08 %
Mortality	1.95%	2.12%	-8.0 %
Slaughterhouse condemnations	0%	1.1%	-1.1 %

Two results stood out. First, mortality was 8% lower in the treated group. Second, at slaughter there were zero condemnations, compared with 1.1% in the control group. The trial did, however, have one limitation: both groups were raised in the same poultry house. The results were therefore treated as a signal that needed to be verified under industrial conditions.

Industrial-scale testing

The second trial applied the treatment to an industrial batch of approximately 22,000 eggs, and the resulting chicks were monitored in a separate poultry house alongside a control house.

The first indication came from the hatchery, where the monitored parameters showed a consistently positive trend:

Incubation parameter	Control group	Treated group
Fertility %	93.24	93.51
Hatchability of eggs set %	88.38	88.74
Hatchability of fertile eggs %	94.79	94.91

We can neither confirm nor rule out that these differences are attributable to the biophysical treatment; at this stage, we are simply reporting the trend in the measured indicators. One question nevertheless remains: how is it that all the parameters move in a positive direction and none falls outside the pattern?

The study thus progressed from around 1,000 to approximately 20,000 chicks in a real production system, with the growing cycle also spanning the heatwave period of summer 2026. The production results are compelling:

Indicator	Treated house	Control house
Cumulative mortality	3.28%	4%
Relative reduction in mortality	20%	–
Average daily gain	+3.15%	reference
Final average body weight	+3.46%	reference

Relative to the total flock, the mortality difference is on the order of one percentage point; relative to mortality in the control house, the reduction is approximately 20%. At the scale of an industrial farm, this translates into hundreds of additional birds reaching the end of the growing cycle, together with a 3.15% higher average daily gain and a 3.46% higher final average body weight.

These percentages will not automatically be reproduced on every farm. Poultry performance depends on genetics, feeding, microclimate, stocking density, and management. The differences will be statistically evaluated, and the technology will be replicated in other production cycles and farms to determine the true magnitude and repeatability of the effect.

What a 5% advantage means for a farm

For the economic extrapolation, we chose a cautious approach. Even though the combined indicators might suggest a larger advantage, we are working with a conservative 5% assumption.

Annual meat production	Estimated 5% advantage
10,000 tonnes	approx. 500 tonnes

Each producer can relate this value to its own production capacity. The key point is that this advantage does not require modifications to poultry houses, replacement of incubators, or the addition of a new product to the feed. The treatment is integrated into the hatchery’s existing workflow by adding process-control units — mobile equipment configurable to the space and capacity of each operation, installed in the egg-storage or pre-heating area without disrupting production.

A more vigorous embryo, monitored through to the end of the cycle

The most important conclusion from the two trials is the simplicity of the intervention: a single application to the egg, after which the chick enters the same growing system and is raised under the same technological conditions as the comparison groups.

The first trial provided the signal; the second, at industrial scale, confirmed the direction. The natural next step is to establish the first unit for the biophysical treatment of all eggs intended for incubation. Poultry producers already have the best benchmark available — the historical performance of their own production and poultry houses. The average performance over the previous five years provides a precise reference against which new results can be assessed. The priority of the treatment remains flock uniformity and chick robustness, with birds less affected by pathogens and by microbial pressure within the local ecosystem.

Two elements are required for this: statistical analysis of the historical data for each ecosystem under study, and extension of monitoring through to slaughterhouse indicators.

Two results pointing in the same direction do not constitute certainty. They do, however, provide a strong reason to continue.

What comes next

We have directed our research toward a problem familiar to every poultry complex: during depopulation and litter removal, an airborne microbial load is generated and can disperse toward neighbouring farms. The issue is straightforward — the quality of cleaning influences the performance of the next flock placement. We are studying ways to reduce this load through a biophysical treatment applied inside the poultry house after the flock has been removed, with the potential to decontaminate existing installations at the same time. We state this clearly from the outset: the treatment is complementary to conventional disinfection and does not replace it. We will return to this subject.

The BTGP program is applied across multiple species. Details are available in the footnotes and on the website.

Closing note

I will close with a personal reflection that goes beyond methodology. The opportunity to work in poultry research is both an honour and a responsibility for me. I represent the second generation of my family committed to contributing value to this profession. My father, Dr Eng. Mihail Mihailov, an animal production engineer trained in Iași, led Avicola Constanța from 1963 to 1989 and subsequently Midia International from 1991 to 2023, and was probably one of Romania's three leading poultry professionals. I grew up at the Moșneni genetic resource facility, among production houses and monitoring records, at an age when other children were learning very different things.

If what we are doing today leaves behind a protocol that is useful to those who come after us, I will consider that I have fulfilled my part of the contribution.

Who We Are

Bio Top Romania is an agricultural cooperative coordinating an applied research programme dedicated to validating biophysical technologies in agriculture, animal production, and aquaculture — solutions for farming under the pressure of climate change. Notable results have been recorded in vegetable production — cucumber +50%, tomato +15%, potato +30% under drought conditions — as well as in field crops (sunflower, soybean, maize, and rapeseed) and aquaculture, with a 50% increase in carp body weight and a 70% reduction in mortality among parasitically infected catfish larvae. Cattle production is also within our research scope, with biophysical treatment of semen aimed at improving the uniformity and vigour of the resulting offspring.

In parallel, we are building an international research and validation network:

- Academy of Agricultural Sciences of Tirana, Albania
- National Centre for Seed Research and Production, Republic of Moldova
- three Greek universities — Agricultural University of Athens, Democritus University of Thrace, Aristotle University of Thessaloniki
- Wageningen University & Research, the Netherlands, and Université de Liège, Belgium
- EGE University, Türkiye
- research laboratories and institutes in Europe, South America, and Canada

The network enables us to validate results under different soil and climate conditions and supports preparation for international technology transfer.

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