BIOSECURITY AND ANIMAL HEALTH IN ORGANIC LIVESTOCK FARMING

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SUMMARY

In order to evaluate the observance and effectiveness of biosecurity measures for organic livestock farms, a specially designed assessment file was sent to 42 county veterinary directorates to be filled in, following a thorough investigation. The evaluation of bovine and ovine organic farms with respect to the biosecurity measures applied, revealed that most of these organic farms have an adequate location, ensuring a good antiepidemical protection. The information thus obtained indicates that, in the light of current standards, the incidence of diseases in organic livestock farms is generally within acceptable limits, better than in conventional farms.

INTRODUCTION

Romania has a remarkable agricultural potential: the agrarian surface is 14,8 million hectares, out of which 9,4 million hectares are arable (63%) and 4,9 million hectares are natural grazing fields (33%). Organic farming was initiated only 10 years ago /7; 9/, and its development began after 2000, together with the first legislative requirements inspired by the European legislation, according to international standards.

Organic farming aims at creating a sustainable agroecological system based on local resources and this is why it is developing nowadays at a fast pace. At present, there are 3033 registered producers in Romania: 121 producers have only vegetal products, 186 only keep one livestock species (182 only keep bees, two keep sheep and two keep laying hens), while the rest have a mixed agricultural and animal production.

Organic farming appeared as a consequence of people's distrust regarding food safety in conventional agriculture and also following the intensification of environmental and food pollution. Because consumers trust organic food production, biosecurity in organic livestock farms is a crucial matter. *Hovi* /2/ defines *biosecurity* or *animal health security* as the sum of the management measures to reduce the risk of introducing a new disease agent to the farm or of allowing existing disease agents to cause financial or health and welfare damage in the herd/flock. Our paper presents a first evaluation of biosecurity and risks from Romanian organic farms and it recommends several solutions for a better antiepizootical protection of organic farms, which may warrant the salubrity of organic products.

MATERIALS AND METHODS

Data regarding livestock organic farming in Romania were obtained from the database of the Ministry of Agriculture regarding the producers, processors and tradesmen of organic products.

Out of the 3033 producers, 27 were selected. Criteria for the evaluation of biosecurity on these farms were included in an evaluation form. Questions were related to the identification and the type of the farm, the definition of the farm from an epizootical point of view, critical points of epizootical risk in that region, definition of risk from an environmental point of view, the system of antiepizootical protection, the qualification of health status on the farm, as well as other criteria. The evaluation form was sent to the county veterinary state authority to be filled in by field veterinarians, following an inspection of the farms.

Water samples were collected from nine farms and they were subjected to chemical and bacteriological laboratory tests. These samples, along with samples collected from other farms were also tested with the Microbiological Field Test /1/, for a comparison and evaluation of the utility of this test.

As requested by organic farmers confronted with the risk of mosquito attacks during rainy seasons, two biological products were also tested: *Vectolex* (spores of *B. sphaericus*) and *VectoBac* (spores and crystals of delta-endotoxin of *B. thuringiensis*). Laboratory tests were performed on mosquito larvae (*Culex pipiens*) that were introduced in various dilutions of the tested solutions. The active concentration and persistence time of the larvicidal effect were determined. Results were then checked under field conditions by applying biological products on the surface of swamps were mosquitoes are naturally reproducing.

Another tested product was *Oxygenon*, which contains hydrogen peroxide and peracetic acid. Tests were made on two strains of Gram negative bacteria (*E. coli* and *Ps. aeruginosa*), two strains of Gram positive bacteria (*St. aureus* and *B. cereus*) and two types of fungi (*Aspergillus* and *Saccharomyces*). Contact times were 15, 30, 60 and 120 minutes. Tests were performed in test tubes and on smooth and rough surfaces that were first sterilized and then contaminated with the microorganisms. The final evaluation of the product was made in a calf stall, which was disinfected and controlled by official sanitation tests, including the Coliform Bacteria Test and the Microbiological Field Test (MFT).

RESULTS AND DISCUSSIONS

The study revealed several important aspects of Romanian organic livestock farming. The zootechnical profile of organic farms varies, but the great majority is either dairy farms or mixed farms with cows, sheep, goats and other species. The great majority of farms are small, with 5–20 cows and/or 300–500 sheep, with a small number of animals from other species. These farms produce fodder on their own land, which represents an important aspect of the antiepizootical protection.

Most farms are properly situated, 89% of them at a distance of at least 300 meters from other farms and 94,5% at a distance of at least 50 meters from village households. Farms are also situated at more than 22 meters from highly circulated roads. Farms are situated on plots of land with smooth slopes, protected from dominant winds and flooding.

Most farms are at a sufficient distance from the pollution sources, except for two farms, one of which is approximately 200m away from an aluminium plant, and another at a similar distance from a chemical storehouse.

Most organic farms (74%) have a protection fence with one or two entrances (11%); only one goat farm is not fenced (3.7%) and three farms have an interrupted fence.

An important deficiency is the fact that only 44.4% of the farms have their own pasture, while animals from the rest of the farms graze in the mountains (40.8%) or on the village pasture (14.8%), where other animals from conventional systems graze as well.

All farms have wells for the water of animals. The chemical and bacteriological water exam indicated that seven out of the nine examined wells provide water that is in perfect concordance with potability norms. The other two farms had a big number of coliform bacteria. The Microbiological Field Test provided results that were comparable to those obtained from laboratory exams, both for potable and non-potable water. As MFT is very easy to use, has a very low cost and can be used on farms, we recommend that this method be used on all farms and the laboratory microbiological exam be used only in particular situations.

As water can represent a source of diseases, one must take into account that, during summer, animals drink from various water-sources on pastures or nearby pastures.

The evaluation of biosecurity and risks on farms faces certain difficulties, as organic farm assurance legislation in the European Union (EU Regulation 209291 and 1804/99) does not say much about animal health security. National regulations are not sufficiently accurate regarding the methods of disinfections and insect and rodent control that should be used on farms. On the other hand, some of the farmers and veterinarians disregard the importance of investments that can insure biosecurity on farms.

There was a great variability in farm decontamination from one farm to another. Only 61% of the farms had a road disinfector at their entrance, and even this is being used only during high epizootic risk periods, following the indications of the veterinarian. We found boots disinfectors in only 33% of the farms, and they were not continually used. A general annual disinfection is performed in 66.6% of the organic farms, and a general annual insect control is scheduled in half of the farms. No general disinfections of surfaces are made in the other farms, except for the whitewashing of walls.

Regarding the substances used for disinfections, it was noticed that farmers do not differentiate between certain disinfectants from the point of view of environmental pollution. The legislation is not clear regarding the categories of substances that are permitted for the decontamination of stables and of rooms where the first processing of animal products takes place. Based on the great efficiency of *Oxygenon,* and on the fact that hydrogen peroxide and peracetic acid are non-polluting agents, we consider that this category of products should be accepted for disinfections in organic farms. Microbiological laboratory tests, both those made in test tubes and those made on smooth and rough surfaces, have indicated that *Oxygenon* has antimicrobial properties against *St. aureus, B. cereus, Ps. aeruginosa* and *E. coli* at concentrations of 0.2%, 0.5 and 1%. The product was effective against fungi only at concentrations of 0.5% and 1%, in 15–30 minutes, at room temperature. The disinfectant effect on rough and absorbent surfaces was obtained with a solution of 1%. In the calf stable, *Oxygenon* 1%, 0.8 l/m^2, for 30 minutes, provided a very good decontamination on all surfaces, including rough surfaces, at rather low temperatures (12–13°C). Tests for disinfection efficacy (Coliform Bacteria Test and Microbiological Field Test) provided similar results.

Biosecurity measures should not target only the decontamination of the environment and the supervision of disinfections' efficacy, but should also address the necessary technological refining of animal rearing systems and protection methods. An emphasis should be put on creating breeds that are highly resistant to usual pathogens. Some specialists have even signalled a potential conflict between short-term biosecurity and treatment measures, which are based on decontamination, together with isolation and treatment of sick animals and the long-term goal of positive animal health, which is aimed at obtaining robust, resistant, healthy animals. Another

important aspect is that biosecurity measures should not increase costs and hinder the development of positive animal health in a natural environment which addresses physiological needs.

The results of laboratory and field tests regarding the efficiency of *VectoBac* and *Vectolex,* indicated a good efficiency and a lack of environmental pollution. *Vectobac* produced the death of mosquito larvae at a dose of at least 127.9 ITU per ml, while *Vectolex* had this effect at a dose of 65 ITU per ml. The persistence of the larvicide effect, at a dose of 12,790 ITU per ml of water, was of about 3 weeks after the application. *Siegel* et al. /11/ have isolated *B. thuringiensis* from the product *Vectobac* and *B. sphaericus* from the product *Vectolex*, at an interval of nine months following their application in ponds. *Moser* et al /10/ tested *Vectolex* CG 7.5% under various field conditions and reported a mortality of mosquito larvae of 91%, when a dose of 2 g / m^2 was used and a persistence of 7 days of *B. thuringiensis* in water. The advantages of a bacteriological control of mosquitoes are that bacterial products do not affect people, animals and useful insects and they do not require special application methods and special work protection measures.

Biosecurity on farms is also very much influenced by the disposal of zootechnical residues ("animal by-products"). In all the organic farms that were evaluated, animals' dejections are deposited on fermentation platforms and are used annually for the fertilization of their own agricultural land. Animal carcasses and other organic residues are thrown in constructed disposal pit (5.8% of farms), are buried in certain places outside the farm (41% of farms) or are collected by specialized companies and neutralized by industrial processing or burning. The regulations regarding the collection and neutralization of cadavers and other organic residues are still frequently disobeyed.

All the evaluated farms were considered free of the contagious diseases characteristic for that species. No zoonoses were noticed on the farms, except for ringworm in bovines. This appears occasionally because vaccination is not allowed on these farms. All farms benefit of qualified veterinary assistance. The veterinarian can be a permanent employee or a consultant. The regional official veterinarians also supervise these farms.

The evaluation forms indicate that morbidity and mortality does not differ very much from those registered on conventional farms. It is difficult to appreciate if the absence of major epizootical diseases is due to housing conditions, to the improved welfare and resistance of animals or to the fact that biosecurity measures are strictly applied in conventional farms, which surround all organic farms. Even if farm biosecurity is strictly correlated to regional and national biosecurity and depends on it, organic farms are exposed to other risks, derived from the breeding system. The main risk is represented by the fact that animals benefit of more freedom of movement and come into contact with various contamination sources.

Other researches show that internal parasitical diseases are more varied and intense in animals from organic farms, when compared to animals from conventional farms /4/.

On the other hand, organic farms are protected from contamination because they are situated at big distances from industrial plants and from conventional farms, because they are not allowed to buy animals or fodder from conventional farms and from livestock markets. However, the efficiency of antiepizootical protection on farms depends a lot on health security "culture" and attitudes of farmers and on the recommendations of veterinarians.

The current regulations and standards for the control of diseases on organic farms recommend alternative medicine, based on herbal preparations, homeopathic medicine and acupuncture, which warrant the production of food with no medical residues /12/. It is still too early to jump to conclusions regarding the efficiency of such methods, but there are premises that unconventional medicine permits the same production as the conventional medicine /8/. Allopathic medicine is

admitted only in situations when alternative medicine are not efficient or when they require prolonged withdrawal periods for foodstuffs from treated animals.

Although specialists recommend various alternative methods with proven efficiency, these are little known in Romanian organic farms, because alternative veterinary medicine (phytotherapy, homeopathy, acupuncure) is not taught in Romanian veterinary schools. The use of various substances such as propolis or charcoal in a wrong way could cause adverse effects on animal welfare, consumer confidence or consumer protection /3; 5/. Farmers often distrust alternative therapy, because it requires multiple applications and a longer healing time, compared to conventional therapy. This is why farmers tend to use conventional methods, especially for parasite control. When these methods are not applied, there is an increase in the incidence of parasitical diseases, which was noticed in other countries, as well /6/.

CONCLUSIONS

1) In spite of the marked development of organic farming in Romania over the last years, there is insufficient collaboration between competent authorities. On the one hand, inspection and certification bodies, which are legally accredited in Romania, do not provide enough support for the consolidation of this field. On the other hand, veterinarians are not prepared, professionally and organizationally, to provide services at international standards applied to organic farming.
2) Most organic farms do benefit of a proper location, which can ensure a basic antiepizootical protection, if hygiene rules are observed. Some farms do not comply with the mandatory fencing of animal stables, while others do not monitor properly the quality of their water sources, which can lead to insanitary food products.
3) The Microbiological Field Test (MFT) is recommended for the periodical supervision of local water sources and for the control of the efficiency of disinfection of surfaces and water. MFT can determine faecal pollution, is simple to use and has a low cost.
4) In view of mosquito control on organic farms we recommend bacteriological methods based on products that contain spores and toxins of *B. thuringiensis* or *B. sphericus*. These products do not represent health hazards for humans, animals and useful insects, such as bees.
5) We recommend the use of peracetic acid and hydrogen peroxide for disinfections in organic farms, because they have a very good disinfective potential, without polluting the environment.

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