

## MAKING A PLAN OF BIOSECURITY ON A PIG FARM

**Atanas Nitovski, Milinko Milenković, Bisa Radović, Valentina Milanović,  
Dragana Grčak, Milovan Grčak**

*Faculty of Agriculture, Lešak, Kosovo and Metohia, Serbia*  
anitovski@gmail.com

Infectious diseases on a pig farm may be spread by exposing animals to infected animals, by exposing animals in their incubation period to dead animals that were not removed properly, vehicles, equipment, clothing and shoes of visitors or employees who have had contact with the herd, contact with other herds, contact with other animals (horses, dogs, cats, wildlife, rodents, birds, insects), but also by contaminated objects, contaminated food, and improper management of manure when it comes to the creation of dust and spraying (Hristov, 2007). Prevention from infectious diseases spreading on the farm and its environment is done by using primary and secondary biosecurity measures. The list of biosecurity measures includes elements related to spaciousness: hygienic and microclimate conditions for pig rearing, care, nutrition and watering, surveillance, regrouping and transmitting swine disease, outbreak control, care of barns equipment and production process organization, which are performed by veterinarians and zootechnicians. Biosecurity standards must concern the necessary health level of the swine herd and the work organization all compulsory health measures for disease control and prevention spreading should be undertaken particularly those whose outbreak must be reported. Biosecurity plans show the present epidemiological situation, potential herd health, production threats, as well as possible solutions that must be concerned (Stanković et al. 2010). The most effective implementation of biosecurity measures on farms provides a development plan for that farm biosecurity. The biosecurity plan we have developed based on detailed observation and analysis of the relevance of indicators and on biosecurity which includes: 1) an actual written plan for achieving and maintaining biosecurity of the farm production based on keeping proper records; 2) isolation of the farm as a whole or individual segments of manufacturing and production operations, 3) including new animals in the herd; 4) health of the herd; 5) evaluations of the equipment and the personnel; 6) traffic and movement control; 7) attitude towards visitors; 8) food and water control; 9) manure; 10) disposal of carcasses of dead animals; 11) relationship to other animals on the farm; 12) population control of rodents and birds; 13) Sanitation (Stanković et al., 2010).

**Key words:** biosecurity; plan of biosecurity; pig farm

## ИЗРАБОТКА НА ПЛАН ЗА БИОСИГУРНОСТ НА СВИЊАРСКА ФАРМА

Заразните болести на свињарска фарма можат да се пренесат преку: контактот на животните со други заразени животни, со животни во инкубациониот период, со мртви животни што не биле отстранети целосно, но можат да се пренесат и преку возила, опрема, облека и чевли на посетители и вработени кои имале контакт со стадото, со повеќе други стада, со други животни (коњи, кучиња, мачки, диви животни, птици, глодари или инсекти), но исто и преку заразени објекти и заразена храна. Болестите можат да се добијат и преку несоодветно управување со ѓубриво, кога станува збор за создавање прашина и прскање (Hristov, 2007). Пренесувањето на заразните болести на фармите и на околината на фармите, се спречува со примена на примарни и секундарни био-сигурносни мерки. Списокот на биосигурносни мерки вклучува одржување на просториите; хигиенски и микроклиматски услови за одгледување на свињите; грижа, хранење и давање вода; надгледување и спречување на пренесување свински болести; контрола на опремата во шталата и организација на процесот на производство, кои се пропишани од страна на ветеринари и зоотехничари. Со биосигурносни мерки мора да се осигури потребното ниво на здравјето на стадата и организацијата на работата и да се преземат сите задолжителни здравствени мерки за контрола на заразните болести и за спречување на нивно ширење, посебно на заболувањата кои мора да бидат пријавени. Во биосигурносни планови се прикажани постојната епидемиолошка ситуација, потенцијалното здравје на стадото, законите за производството, како и сите можни решенија кои мора да бидат земени предвид (Stanković и сор., 2010).

Најефективното имплементирање на биосигурносните мерки на фармите се обезбедува со развоен план за биосигурноста на односната фарма. Планот за биосигурност го имаме изработено врз основа на детално набљудување и анализи на важноста на индикаторите на биосигурноста. Тој план вклучува: 1) остварување и задржување на биосигурноста на фармата и водење соодветна евиденција; 2) изолирање на фармата, цела или само делови на производството; 3) вклучување нови животни во стадото; 4) здравје на стадото; 5) оценување и проверка на инструментите за работа, како и на вработените; 6) контрола на сообраќајот и движењето; 7) однос кон посетителите; 8) контрола на храната и водата; 9) ѓубриво; 10) исфрлање на лешеве на мртвите животни; 11) однос со другите животни на фармата; 12) контрола на популацијата на глодарите и птиците; 13) канализација (Stanković et al., 2010).

**Клучни зборови:** биосигурност; план за биосигурност; свињарска фарма

## INTRODUCTION

On a large pig farm and a large concentration of animals in a relatively small area which is one of the key features of intensive production, application of certain Biosafety measure is necessary to preserve the health of pig herds and to prevent the introduction and spread of disease and preservation of production. Work on the formulation and implementation of biosecurity plans involves sustained commitment to creating and maintaining a satisfactory living environment for animals and their production (Stanković et al., 2007).

Development of specific biosecurity plans require review and achieving the necessary level of herd health status, organization, scope and type of production on the farm, predicting all necessary measures to control the herd health status and prevent the introduction and spread of infectious diseases, especially those whose existence must be reported. These diseases are listed in the program of animal health protection measures for the Republic of Serbia in 2012. One must take into account the current epizootic situation and anticipate potential threats to health and production on the farm and possible solutions. Biosecurity plan should contain a commitment to efficient and regular cleaning and disinfecting parts of farms where animals live.

In the developing biosecurity plan we used: 1) Rules on determining the program of animal health protection measures for 2012 (Official Gazette of the Republic of Serbia, no. 21/12), 2) "Standards of Biosecurity on Farms – Basicsetting Biosecurity Plans (brochure) Ministry of Agriculture, Trade, Forestry and Water, Management for Animal Health, 3) Ordinance on veterinary sanitation facilities for breeding, ungulates, birds and rabbits (Official Gazette of the Republic of Serbia, no. 81/2006). Principles of biosecurity on the farm – Design guide for biosecurity plans of the Ministry of Agriculture, Fisheries and Rural

Development, Veterinary Administration of the Republic of Croatia, 2011.

In this paper we also used to supplement the program of measures and standards biosecurity with the following works: 1) Biosecurity Plan for Australian Dairy Industry, 2) Biosecurity: Health Protection and Sanitation Strategies for Cattle and General Guidelines for Other Livestock of the Ministry of Agriculture, Food & Rural Affairs in Ontario; 3) Biosecurity for Dairy Facilities from Animal Health Information of the Department of Agricultural Resources, Division of Animal Health, Boston, MA, USA.

## EXPERIMENTAL SECTION

In one of previous work for 2nd European Symposium on Porcine Health Management, Pig Health, Welfare and Performance, in Hanover 2010, we are explained the application of biosecurity measures on pig medium size farms (250 sows). The aim of this study was to find the most sensitive places on a modern pig farm with 250 sows in reproduction, breeding sows and breeding boars, to assess biosecurity and present the owner of the farm.

The aim of this paper is for a large modern pig farm biosecurity plan to help their colleagues on the farm in a better implementation of biosecurity measures, and thereby protect the health and improvement of production of all categories of pigs on the farm. The pig farm has a capacity of about 1500 sows, a closed type and is located near Leskovac. The farm is designed as a modern pig farm, which takes into account the existing legal regulations governing the needs of all categories of pigs for housing, feeding and watering. The plan is projected by the Institute for Science Application in Agriculture in Belgrade and has adequate technical-technological solutions for the proposed

number of breeding animals and their way of keeping. The plan was prior to the construction of farms and the farm type choice so we chose to construct a pig farm Repro-center for supplying quality gilts and boars, and the rest of the pigs we put in our own breeding. Therefore, we decided to build a closed farm which means the farm's own herd of breeding pigs to provide further breeding, to have the rearing of their part for fattening (feedlots). The time is rounded production of pig fatteners and sows, which is the essence of the look and function of the closed farm.

The site selection is limited by law on the construction of a farm near the settlements and the terms of reference of the farm size. There are also important geological and climatic tests, which specify the position of the farm. Given the available land, it was difficult to secure the area and objects respecting the present "wind rose" were found. The farm is away from residential buildings on a prescribed distance of at least 1 km, which reduces the presence of unpleasant odors from the farm in nearby villages, due to the creation of  $\text{NH}_3$ ,  $\text{H}_2\text{S}$ , methane,  $\text{NO}_2$  and other products of decomposition of organic matter. There is the possibility of air, dust, etc., how to transfer the infection to the farm. Around the farm there is not another farm at a distance of 2 km, and the farm keeps only one species. The farm was built on land with good storm water runoff. It is surrounded by good access roads, a road within the farm, which are paved for easy maintenance and disinfection. In selecting sites, it is important to provide a good supply of electricity, water and food (Nitovski A, 2006).

The planned number, category and technological processes on the farm, have been designed and production facilities built. The farm consists of a repro-center and feedlots and enclosed by a fence of woven wire height of 1.80 m, with two rows of barbed wire, for a total height of 2 m.

The farm is divided into five zones: A, B, C, D and E. All zones are divided by the mentioned wire fence with plants and adequate distribution of trees, shrubs and flowers. Along the north side is a lined avenue of trees to reduce wind blows. We have said that the objects are turned so that the minimum size and the closed part are facing the "wind rose".

In zone A, which is a non-production part, at the entrance to the farm there are a school and pedestrian barriers. The school barrier is  $6 \times 3 \times 0.25$

m, the pedestrian barrier is a  $1 \times 1 \times 0.10$  m. In addition to pedestrian barriers there are two vessels. In one there is disinfectant where hands are dipped, in the second one there is water to rinse hands. Barriers to the school on a pig farm are not covered, and coverage barriers prevent atmospheric precipitation from diluting disinfectant concentration in the barrier, and prevent excessive evaporation during the direct insolation on barriers. It is a common shortcoming of the disinfection barriers on all farms.

Drains of 0.5 m width should be placed around disinfection barriers, the task of which is to collect the liquid poured from the barriers and to implement better reception. We propose that in addition to disinfection barriers sprinklers with disinfectants that are activated by passing trucks should be installed. It is also necessary to separate the liquid from the barrier and not to interfere with the slurry. This fluid barrier, 2% NaOH solution, after a time becomes dirty with dust and stones brought by trucks with wheels, garbage utility service in the sewer system and is subjected to cleaning the collectors. It is also important the sewage and waste water from the dressing room and office building to be collected separately from slurry from the farm. Only the objects maner collects, processes and costs of agricultural land (Nitovski A., 2006.).

At the entrance to the farm a reception desk is located with a room to accommodate officers who are charged individually to record and sell pigs and fattenings. We must emphasize that we live in a society where tradition is to provide winter food with pork, both dried and fresh, it is inconceivable to have a holiday without roasted pig. It is therefore necessary to provide individual sales with the provision of conditions for maintaining biosecurity on farms, some new procedures of manner of breeding of pigs. This is probably related to our entry into the EU where the conditions of work and business are far more rigorous and do not allow the slaughter of animals under the age of 6 months or weighing less than 100 kg. Of course, it also allows slaughter facilities in the certificate of eligibility of the HACCP system.

In this part of the farm are the management building and the wardrobe for employments that lead to a pedestrian path that must intersect with the path from clothing to farm production. So on the intersecting roads pass we proposed changes of movement in order to avoid subsequent contamina-

tion of workers shoes. The administration building is a general term for a group of rooms for administration, a veterinary office, a dressing room for workers and persons entering the farm, toilets, facilities for food and rest of workers, a room for storing disinfectants, a room for storing equipment and supplies.

In the zone A there are a hydrophore that is associated with their own wells, an aggregate house with a generator which includes the lack of electricity from the power grid, a workshop for the repair of the farm equipment, a garage to house their own vehicles. It is estimated that the need for washing facilities on the farm should be their own wells for economic reasons. The farm has two wells at depths of 80 m and 120 m. In the hydrophore home a chlorinator is located that automatically disinfects water by adding chlorine preparations.

In the zone A in the part of the quarantine are newly purchased sows and boars that are in a special mode of holding or isolation for a minimum of 4 weeks are placed in quarantine and if conditions allow, the length of stay is 6 weeks it refers. To the two average incubation time of infectious diseases, except for some diseases with an extremely long incubation period, which are rare in our country.

The farm which is located in the Zone A areas for receiving, inspection, and disposal of carcasses of dead animals is called "slaughter house". The bodies were transported to the slaughter house of repro-centers or part to keep the breeding herd and piglets to 25 kg. The bodies were sent after the examination and bacteriological tests on the bodies from the Veterinary Institute in Niš, housed in a freezer chamber. From the chamber bodies were transported every 30 days by special vehicles in the rendering plant in Padinska Skela, and Zrenjanin.

In the transition from the non-production zone in the manufacturing zone B, there is a school, and next to it pedestrian barriers.

In the Zone B – Zone of production, there are facilities for holding and storage of the breeding herd, the piglets to 25 kg, while the second part is part for fattening pigs. There are also a service center with a laboratory for the VO, an individual await part, a group await part, a pigs part, two objects for farrow, two objects for breeding suckling pigs, and two objects for breeding pigs. The part for fattening pigs consists of four buildings with about 6000 pigs per turn.

In addition to these facilities for keeping and breeding animals, in the zone B there is also a veterinary dispensary with a point of a few boxes. The veterinary point of storage is supplied with the handy medicines, disinfectants, insecticides, a dry sterilizer and the necessary instruments for cesarean delivery, castration and other minor surgical procedure, the necessary number of different syringes and needles. The farm is with an administrative building and a warehouse for storing drugs and a warehouse for spare parts for the farm equipment.

The zone B is divided into two parts, one is intended to keep breeding and breeding herds of pigs to 25 kg, and the second part of the breeding station for fattening young males to 100 kg. Between these two parts there is a lawn area of 500 m width. This area represents the optimum distance for the prevention from infection in aerogenic way. The literature contains data on the possible spread of infection at a distance of 4 km. In practice, the same kind of animal farm is not built closer than 2 km distance.

On this farm complete separation of feedlots reproductive parts, and to supply food feedlots, sale and transportation of pigs, dead pigs used roads of the repro-center is not fully complied. A significant compromise on biosecurity of farms in both directions requires more frequent disinfection of roads through the farm and rigorous disinfection of vehicles entering the farm.

In the feedlots there are also facilities for the receipt, review and disposal of carcasses to rendering plants for their delivery. In the refurbished feedlots there is one object in a test station. It consists of three rooms one of which was used to test boars and two rooms used for gilts testing.

In the zone C there are a plant and facilities for receiving, processing and storage of liquid manure and its evacuation from agricultural land around the farm.

In this section there is a fenced area to accommodate waste from the farm such as medicine bottles, powder boxes, light bulbs used for heating the piglets, the waste from the office building and so on. A better solution is setting up a large bucket, which is replaced by the weekly communal service.

The zone E is under the special regime of preservation because it contains a large tank for storing propane-butane gas capacity of 500 m<sup>3</sup>, a gas station to accept gas and its distribution to

farrow rearing, a gas pipe system to bring up gas (gas) for heating farrow rearing.

Ventilation facilities of the repro-centers are made by combining natural and mechanical ventilation and in the feedlot facilities a combination of natural ventilation opening windows and roof lanterns is used. In the farrowing and breeding houses on ventilation is under pressure, which means that the fans suck the air entering the building through semiopened windows.

## RESULTS AND DISCUSSION

The biosecurity plan was prepared as recommended by the Ministry of Agriculture contained in the brochure "Standards of Biosecurity on Farms – Basic Setting biosecurity plans, and the Regulations on establishing the Program of animal health protection measures for 2012. The biosecurity plan includes consideration of the user activities in the following technological processes:

### *1. Existing, setting and a written plan for achieving and maintaining biosecurity on the farm production based on keeping proper records*

The written biosecurity plan includes keeping required records, such as keeping data on the treatment of animals and the outpatient withdrawal protocol, conducted data on mortality of animals, record keeping on putting animals on the market, and management of monitoring data prepared by the farm veterinary inspector. It is necessary to insist on daily record keeping required as a prerequisite for monitoring and controlling the implementation of the biosecurity plan. Planning activities at the farm includes not only the introduction of new animals to the farm, but also moving animals on the farm (e.g. switching from await part in the maternity ward, maternity wards in the Service center, etc.). Placing the animals on the market and must be considered and necessary records must be taken.

### *2. Isolation of farm as a whole or individual segments of manufacturing and production operations*

Isolation involves housing animals in special facilities returned to the farm from where they

were in contact with other animals (e.g. exhibitions, fairs) at least for two weeks. If it is impossible to achieve complete isolation, the animals need to be isolated using partitions in the same building, or to prevent direct contact between animals, and it is particularly important not to allow the use of feeders and drinkers who use healthy animals or animals that are not quarantined. Clothing and footwear worn by workers in the facility where animals are housed in isolation need to be changed before entering the premises with animals that are not in isolation. Animals showing signs of illness should be isolated as soon as possible ever before you call the vet.

### *3. Introduction of newly acquired animals in a herd*

The introduction of new animals in the herd is usually for the selection of reasons: to fill the number of animals, acquisition of new bulls and heifers for "Blood Fire" and others. When receiving newly acquired animals quarantine should be organized for these animals. The worker must wear special clothing and footwear in the quarantine and must not go into other productive areas. He subscribes to daily health situation and keeps records. The length of quarantine is about 28 days, or two average periods of disease incubation of 14 days. There is a corresponding number of objects on the farm where quarantine can be organized.

### *4. Health of the herd*

On a large farm and in general on farms it is necessary to have daily monitoring of animal health. The health status is monitored by direct inspection of the condition during daily visits to the farm, during the "visit" and the veterinarian inspection of records, or records of mortality and a record of treatment of animals on the farm. Therefore, the necessity of daily changes in the appropriate input records is important. Changes in health status are evident changes in production, with a decline in production results. The smaller the increment, the weaker is the entering estrus there is an extension of the service period, which increased the number of dead animals. The clinical signs of disease are recognized, there is a change in the behavior of animals, they become agitated with uncoordinated movement, timid or irritable. The change of health leads to changes in food in-

take and water. It leads to lower food intake and a greater need for water intake, which is used in the treatment of young animals with medicament or drug dissolved in water with a vitamin mineral supplement. In cooperation with your veterinarian you should develop a plan of action when suspicions of an infective disease appear which include description of the situation in which you plan to react to the phenomenon where a large number of animals show signs of illness. When there is no significant decrease in production or when the usual therapeutic procedures do not provide adequate results, or do not result in visible improvement of animal health and you expect a large number of deaths, you should have recorded telephone numbers of persons in such situations in order to invite and be in contact with veterinarians, farm managers, veterinary inspectors, veterinarian from the Veterinary Institute, professors of veterinary and agricultural universities. The plan should include restriction of movement of animals and people and vehicles on the farm. This means reduced sales of animals, buying new animals, but also reduced required amount of food and so on. Other measures are undertaken which are recommended by the veterinary services in collaboration with colleagues from the Veterinary Institute, which covers this epizootiological pig farm.

#### *5. The ratio of staff to the equipment*

The farm is fully equipped for accommodation, food, feed, milking, manure, disinfection, treatment, transport, ventilation and other equipment that is aimed at the preservation of good health and good production results. Therefore, the daily inspection of the legality of this equipment is a very important precondition for the realization of the biosecurity plan. Therefore it is necessary for workers constantly to emphasize the importance of proper storage and maintenance of all equipment on the farm, with a bad attitude towards the equipment should be punished and good one to be rewarded.

#### *6. Control of movement and circulation*

The farm has vehicular and pedestrian traffic. Trucks come to the farm bringing food, trucks that bring in new animals sold or transported animals, trucks bringing raw materials for food mixers, hay or silage for raw materials, trucks that transport

dead animals or animals sent to be slaughtered economically. None of the vehicles enter the farm if there is no confirmation of disinfection in the veterinary station or other authorized institutions, and at the entry of all vehicles daily records should be taken. Care must be taken not to cross the roads clean and dirty on the farm, and that the workers at the entry to the farm to go clothes "dirty", and the production facilities a "clean" way. The truck drivers should be asked not to leave the vehicle or to move in the vicinity, where they are prohibited from entering the production facilities.

#### *7. Relationship to visitors*

Colleagues come to the farm from other farms, breeding animals, customers, buyers of beef, male animals which are excluded from breeding, organized visits of students of secondary schools and colleges, veterinarians from the Veterinary Institute, veterinary inspectors, workers for service companies that perform pest and rodent control. To enable the farm to be an experimental space for training young professionals of different profiles of education from high school, college students and young farmers and building high-production and protection, we must strictly ensure that the farm does not enter the infectious material and induce infectious, parasitic or organic diseases. The farm should provide the required number of coats, disposable coveralls, boots, greaves work clothes. Visitors to the farm should get clean shoes and clean clothes. It is good for visitors to the farm to provide a disposable cover for clothing and footwear.

#### *8. Control of food and water*

The farm has its own feed mixers. Recipes are compiled by experts at the farm and the ranch farm of Veterinary center in Niš. Piglets to 15 kg body weight can be bought. Quality control of raw materials to blending is done in our own laboratories at the ranch of the Veterinary center in Niš. Finished mixes can be controlled in our own laboratory and in the laboratory of the ranch of the Veterinary center in Niš.

Water supply is done by providing, their own water from wells. The farm has two wells with water towers that provide the required amount of water for drinking, flushing system for milking, cleaning and disinfection facilities. The farm has a

contract on business-technical cooperation with the Institute for Health Protection, which controls the quality of water for 15 days. Each well is secured with chlorinators that automatically perform chlorination. The performed analyzes of food and water maintains separate records under the control of veterinary inspection.

Thus the farm has enough quality and hygienic food and water that provide a smooth development of young animals, a high milk yield and reproductive performance.

### 9. Manure

Manure from all objects it such a canal system leads to a reception pit with 300 receiving pit m<sup>3</sup>. Manure pump switches to the cylindrical separator which separates the solid from the liquid part of the slurry. The hard part falls into the trailer to be located below the separator, a drop of liquid is carried to the decanters. We must note here the omission made in the construction of lagoon. In order to prevent drainage of the slurry from the lagoons into the deeper layers of earth beneath the lagoons and the possible contamination of underground water flows, there is a lagoon with a thicker coating of plastic film that is impermeable and chemically resistant organic matter from the liquid manure. It is a more expensive and more permanent way of lining of their concrete lagoons. It should be noted that the farm was installed with all equipment for the processing of slurry which included the presence of a number of oxygenates in lagoones. Their function has been to turn the propeller thrown in the air content of lagoons, to perform oxygenation, to prevent anaerobic fermentation, to reduce unpleasant odor and decomposition of organic matter. After oxygenation and ripening of slurry for 90 to 120 days, manure can be carried out to the agricultural land, best in fall and spring, prior to sowing. You must keep a record of parcels where manure was transported and the quantity of slurry was dispersed in the plot.

It is believed that from 60 to 90 tons of liquid-manure slurry can be dispersed per hectare. Looking at the distribution of slurry in certain cultures and certain months, it can be said that when it comes to wheat and other cereals, slurry distribution can be done immediately after harvest, from July until winter. As for maize distribution of liquid manure is possible during winter and spring,

distribution of rows after sowing, and plant height to about 60 cm, in order to recharge nitrogen substances. Meadows and pastures can be fertilized during fall winter and early spring, when there is no vegetation, rarely applied in summer after grass mowing. Orchard can be fertilized during the year when weather conditions permit.

### 10. Disposal of carcasses of dead animals

The farm is located in Zone A areas for receiving, inspection, and disposal of carcasses of dead animals called the "slaughter". The bodies were transported to the slaughter of repro-centers or part to keep the breeding herd and piglets to 25 kg. The bodies were sent after the examination and bacteriological tests on the bodies of the Veterinary Institute in Niš, and housed in a freezer chamber. From the chamber bodies were transported every 30 days by special vehicles in the rendering plant in Padinska Skela, and Zrenjanin.

### 11. Relationship to other farm animals

The farm can not keep other animals other than dogs who guard it tied near the farm fence move from the fence next to the chain.

### 12. Control of rodent and bird populations

During spring and summer months the farm has reduced the number of rats and mice who have moved to the fields around the farm. Since the beginning of rainy days the number of rodents increases. Eradication and fumigation are entrusted to a private firm which is specialized in performing these tasks. There are no vessels with liquid poison (e.g. Rosol), the vessels with rodenticides are not well distributed, and therefore lacking in production facilities. We recommend a triple ring around the production facilities and food mixers. The first ring is next to the fence and should enable the first intake of poison beside the fence. The second ring has manufacturing facilities around the outside. The third ring is set up in the bowls to the objects themselves. We insisted on periodic changing of types of baits such as fish, cheese with dried meat products, always with food of animal origin, which does not have the recipe for the concentrated feed for pigs.

### 13. Sanitation

Sanitation includes personal hygiene, cleaning and disinfecting materials, people and equipment entering the farm and hygiene of personnel and equipment on the farm. Disinfection is carried out in three steps such as cleaning, washing and sanitary use of disinfection and disinfection solution. We insisted on farm management to strict adherence to these procedures. When selecting funds, we proposed disinfectants funds that have bactericidal and virucidal effects such as Virkon, Sporotal, Hibitane (Hlorhexidin gluconat). Quaternary ammonium compounds as Tego, Desu can be used at the entrance for hand washing. The school and pedestrian barriers should pour 3% formaldehyde or 2% NaOH.

We insisted on disbarriere covering of the barrier to reduce evaporation from the disbarrier and the impact of atmospheric dilution of the disinfectant. We suggested in addition to disinfection barriers incorporating sprinkler wheels and lowering the truck and trailer. In this way there is no influence of precipitation on the concentration of disinfectant agents, contamination and mixing of disinfectant with dust and mud to create a barrier and so on. We insisted on setting a motor or an electric pump at the door of the farm that will allow safe disinfection of vehicles entering the farm. A vehicle which does not possess a certificate of disinfection from a veterinary station or other authorized institution or organization can not enter the farm.

According to the program of animal health protection measures for 2012, marking and registration of animals, are implemented and Biosafety zoo-sanitary measures and animal welfare as well and implemented measures of immuno-prophylaxis (pig pestis) and diagnostic tests (*Tuberculosis*, *Brucellosis*) too. Diagnostic tests are performed at abortion and records of abortions performed are kept.

The farm within the implementation of biosecurity measures is to determine the level of indicators of biosecurity. Indicators of biosecurity are the most sensitive places on our pig farm. These are parts for forrowing, suckling pigs, parts for breeding pigs. These facilities have been paid special attention because they expect the greatest impact of pathogenic microorganisms, parasites, viruses, molds and fungi.

Ministry of Agriculture of Canada in Ontario works on biosecurity measures of Biosafety safeguards against the entry of diseases on the farm, and measures against spread of diseases. Protection against the entry of diseases includes: Management of New Arrivals, how to Maintain a herd, Isolate new arrivals, Know the source of purchases and Use of laboratory testing, Use vaccines.

Prevention of the Spread of Diseases: Management of Farm Traffic Control – birds, rats and mice control, control of people and pets, vehicles control and traffic patterns on the farm, feed and feeding equipment control, Management of groups and housing, Sanitation and disinfection management, Disposal of dead animals, Manure manage and flies control, maternity Management, sick and calf pens, Use disifectants, Foreign animal diseases, Border control, On-farm control, Disinfectants for Boot Wash.

Biosecurity Plan of Australian Dairy Industry in Measures for Reduced the risk of introducing infectious diseases contains the following parts: Introduced Stock, Vehicle / People Movement, Stockfeed, Boundaries, Feral Animal and Wildlife. Measures for Reduction of the risk of spread of diseases on the farm contain: Regular Monitoring and Investigation of Animal Illness / Death, Maintain Good Animal Management, Dead Animal Management, Effluent.

In Biosecurity for Dairy Facilities, of the Division of Animal Health from Massachusetts Department of Agricultural Resources, are Three Major Components of Biosecurity confirmed: Isolation, Traffic control and Sanitation. Key farm management practices prevent or reduce the following hazards to acceptable levels:

Biological Hazards – You should have a plan for controlling risk from viruses, bacteria, parasites and other contaminants. These controls must be considered from the standpoint of: 1) Introduction to the farm; 2) Exposure within and spread within the herd, 3) General and specific measures for immunization; 4) Minimizing the risk of export to other farms.

Chemical Hazards – You should have a plan for handling and storage of pesticides, herbicides, feed additives, drugs, medicines and any potential toxic materials.

Physical Hazards – You should have a plan for animal handling and treatment to minimize trauma and maximize comfort and care. This in-



cludes ventilation, traffic flow, housing facilities and animal handling equipment.

#### REFERENCES:

- [1] Neil G. Anderson (2011): *Biosecurity: Health Protection and Sanitation Strategies for Cattle and General Guidelines for Other Livestock*, Ministry of Agriculture, Food & Rural Affairs, Ontario, Canada.
- [2] Nitovski A., Milenković M., Dragana Grčak, Bisa Radović, Stoja Jotanović, Valentina Milanović, Vukašinović S. (2011): Biosecurity Assessment Measures on a Cow Farms, Research people and actual tasks on multidisciplinary sciences, *Proceedings of the Third International Conference*, Lozenec, Bulgaria, 8–10, June 2011, Vol. 1, p. 232–235.
- [3] Nitovski A., Milenković M., Stoja Jotanović, Valentina Milanović, Bisa Radović, Dragana Grčak (2010): Assessment of biosecurity measures on a pig farm, *Proceedings of the 2nd European Symposium on Porcine Health Management, Pig Health, Performance and Welfare*. Hanover, p. 170.
- [4] MA Department of Agricultural Resources, Division of Animal Health (2010): *Biosecurity for dairy facilities*, Animal Health Information, Boston, MA, USA.
- [5] Stanković B., Hristov S., Zlatanović Z. (2010): Biosecurity plans development on dairy and swine farms, *Agroekonomik Zbornik naučnih radova Instituta PKB*, Beograd, Vol. 16, br. 3–4, str. 125–132..
- [6] Stanković B., Hristov S., Bojkovski T. J., Maksimović N. (2010): Health status and biosecurity plans on pig farms, *Biotechnology and Animal Husbandry*, 26 (1–2), p. 29–35, Publisher: Institute for Animal Husbandry, Belgrade-Zemun.
- [7] Hristov S., Stanković B., Joksimović-Todorović Mirjana, Davidović Vesna (2007): *Biosecurity measures on cattle farms*, Welfare of farms animal and Biosecurity on farms. Monography, Belgrade, Vol. 1, p. 259–269.
- [8] Nitovski A., Valentina Milanović, (2006): Tehničko-tehnološki principi izgradnje i funkcionisanja male porodične farme svinja, *I Međunarodni Simpozijum o merama za unapređenje poljoprivredne proizvodnje na Kosovu i Metohiji*, Vrnjačka Banja, *Zbornik radova*, Vol. 1, str. 181–185.
- [9] Australian Dairy Industry (2003): *Biosecurity Plan*, Version 1, June 2003.
- [10] Ordinance on determining the program of animal health protection measures for 2012 year. *Official Gazette of the Republik Serbia*, No. 21/12.
- [11] Ordinance on veterinary sanitation facilities for breeding of ungulate, ungulates, birds and rabbits, *Official Gazette of the Republik of Serbia*, No. 81/2006.
- [12] *Standards of biosecurity on farms – Basic setting biosecurity plans*, brochure, Ministry of Agriculture, Trade, Forestry and Water, Republik of Serbia, Management for Animal Health.

