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Family pig production: training experiences from the Municipal University Center

La producción porcina familiar: experiencias en la capacitación desde el Centro Universitario Municipal

Produção suína familiar: experiências de formação a partir do Centro Universitário Municipal

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ABSTRACT

The production of food for the Cuban family is a matter of national security according to what Army General Raul Castro Ruz has stated, and therefore it must be addressed by all institutions, including the University. However, there are still difficulties with the training of independent producers from the University. Hence, this study aims to design a system of training workshops for pig producers of the Minas de Matahambre Popular Council, developed by the Municipal University Center, which was made from the identification of the difficulties for the management of the pig mass by these producers. To develop it, methods of the theoretical level were used (historical-logical, content analysis, analytical-synthetic, generalization), of the empirical level (survey, interview and observation) and techniques of the descriptive statistics, that allowed to verify empirically the lack of knowledge relative to this activity in the referred producers and to propose a System of Workshops for their training.

Keywords: training; pig producers; productive sector

RESUMEN

La producción de alimentos para la familia cubana es una cuestión de seguridad nacional de acuerdo con lo planteado por el General de Ejército Raúl Castro Ruz, por lo que debe ser atendida por todas las instituciones, incluida la Universidad, sin embargo, aún persisten dificultades con la capacitación a los productores independientes desde la misma. De ahí que el presente estudio tiene como objetivo diseñar un Sistema de Talleres de capacitación para los productores de cerdo del Consejo Popular Minas de Matahambre, desarrollado por el Centro Universitario Municipal, el cual se efectuó a partir de la identificación de las dificultades para el manejo de la masa porcina por estos productores. Para desarrollarlo, se emplearon métodos del nivel teórico (histórico-lógico, análisis de contenido, analítico-sintético, generalización), del nivel empírico (encuesta, entrevista y observación) y técnicas de la estadística descriptiva, que permitieron constatar empíricamente la carencia de conocimientos relativos a esta actividad en los referidos productores y proponer un Sistema de Talleres para su capacitación.

Palabras clave: capacitación; productores de cerdos; sector productivo

RESUMO

A produção de alimentos para a família cubana é uma questão de segurança nacional, de acordo com o que afirmou o general do Exército Raul Castro Ruz, pelo que deve ser abordada por todas as instituições, incluindo a Universidade. No entanto, ainda existem dificuldades com a formação de produtores independentes da Universidade. Portanto, este estudo visa desenhar um sistema de jornadas de capacitação para suinocultores do Conselho Popular de Minas de Matahambre, desenvolvido pelo Centro Universitário Municipal, que foi feito a partir da identificação das dificuldades para o manejo da massa suína por esses produtores. Para o seu desenvolvimento foram utilizados métodos do nível teórico (histórico-lógico, análise de conteúdo, analítico-sintético, generalização), do nível empírico (levantamento, entrevista e observação) e técnicas da estatística descritiva, que permitiram verificar empiricamente o desconhecimento relativo a esta atividade nos referidos produtores e propor um Sistema de Jornadas de Trabalho para a sua formação.

Palavras-chave: formação; suinocultores; sector produtivo

INTRODUCTION

As one of the essential tasks of the new University in Cuba, it has been reiterated that of attending to local development from its scientific-academic potentialities, responding to the demand for training of the different social actors.

Students must be trained from a close university-business relationship, where professional pedagogy acquires its true dimension as a model of work skills, that is, for the production of goods and services (Dueñas Bravo & Iglesias Hernández, 2017).

In the particular case of the training of independent producers from the Municipal University Centers and the University itself, the idea has gained special strength in recent years, with the vision of the President of the Councils of State and Ministers, who has maximized the transforming and multiplying role of the universities.

The Municipal University Center (CUM in Spanish) of Minas de Matahambre, since its foundation, was integrated to the training tasks of the productive and service sector by request of the authorities of the territory, responding to specific needs that saw in it a solution to the remoteness of the provincial capital and the level of the cloister. However, there are no specific references associated with the Independent Pig Producers (PIC in Spanish). They play an important role in responding to most of the vital needs of society through the inventiveness and creativity developed at the municipal level, contributing to the saving of resources that can be allocated to key areas of the nation's development.

The growing demand for animal protein for human consumption generates great interest in the production of fast-growing animals with a short generation gap. In this regard, the pig is a key element in livestock production. This is due to its capacity to adapt to different handling and feeding systems, its high prolificacy and the variety of products it provides.

Araújo, Cerqueira, Pires and others (2018) see an advantage in the independent production of pigs, considering that "The use of local breeds in alternative production systems has a number of advantages such as environmental management, biodiversity and sustainable agricultural production, oriented towards a market for products of differentiated quality, especially in disadvantaged areas".

In line with this, pigs have been reared with the aim of producing and obtaining their meat for human consumption in natural or industrialized form. Pigs are characterized by their high production capacity.

Global pig production is marked by the growing dichotomy of production systems; on the one hand, traditional small-scale subsistence systems; on the other, specialized industrial systems. The latter follow a distribution pattern similar to that of the intensive poultry sector as they are concentrated near urban centers and sources of inputs (Cánova Herrandiz et al., 2019, p. 422).

In the particular case of the PIC that deal with pig breeding in the Minas de Matahambre Popular Council, it should be noted that they lack the minimum preparation required to carry out these functions, despite the fact that there are novel experiences in the country that have contributed to making this activity one of the most profitable and successful in the production of meat for human consumption and industry.

Examples of such experiences that should be taken into account are:

I. In the selection of breeds to be used

Cuba's creole pig, the nation's genetic heritage, is an important source of low-cost meat and fat in rural areas, thanks to its qualities such as: high resistance to diseases, including parasitic diseases, and consumption of non-conventional foods from which they obtain in many cases all the nutritional elements to live, develop and reproduce. The adaptation to the most extreme conditions of tenure has allowed it to maintain a population, although low, stable, despite the continuous introduction of breeds and genotypes, especially more productive, but more demanding from the point of view of management, feeding and health monitoring (Reyes Avila et al., 2010, p. 604).

Barba et al. (1998, p. 558) state that "(...) on the farm by individual producers, the Cuban Creole Black Pig has numerous advantages since, on the one hand, it takes advantage of the available natural resources and various agricultural by-products and, on the other hand, it produces very high-quality food.

Currently there are more than 100 breeds of pigs worldwide, recognized, improved and specialized and more than 270 local breeds not improved, with rustic characteristics. This is the case of the Cuban Creole Black Pig, a native breed of special importance within the new requirements of the agriculture in the country.

Over the last 40 years, Cuba has based its livestock production on the exploitation of selected imported breeds, usually poorly adapted and not very resistant to the environment and which have never achieved the same yields as in their origin. This agricultural policy has led to the removal of the Cuban Creole Black Pig from the farm, since it is a pig population that lacks the appreciable skills of a specialized animal, but the countries of Central America and the Antilles are located in tropical latitudes and in these climatic conditions it is difficult to obtain concentrated feed in sufficient quantity to ensure a solid diet for the pigs. In general, extensive farming is carried out in these regions, under very rustic conditions.

Under these circumstances, the Cuban Creole Black Pig has numerous advantages since, on the one hand, it takes advantage of the available natural resources and various agricultural by-products and, on the other hand, it produces very high-quality food. For this reason, the potential for adaptation of these animals to a diversified production structure can be practically unlimited (Cardoso Carreño et al., 2016).

Pig production based on non-conventional or alternative feeds has a great deal of experience in the western region of the country, where pigs have long been fed with the by-products of sugar cane, such as secondary honeys (B honey and C honey) from the sugar production process. The objectives of the new food production policy in Cuba therefore include the integration of the creole pig into production structures compatible with the sustainable development of ecosystems. The main objective of the Pig cattle Programme is to achieve sustainable development in mountain areas, where the exploitation of the creole pig is particularly important for the use of natural resources.

The Creole pig is an environmental, rustic and disease resistant breed, not very selected by man and which has a great capacity to adapt to the most hostile conditions that make

it very interesting for the purposes described above. It is mainly used as a parent line in intensive outdoor breeding systems and within pig enclosures in purebred systems.

II. In the feeding of pigs

The feeding of pigs is the main concept of the production expenses of this species, since it demands food with a high nutritional value that guarantees efficient production rates. However, within the growing demand for animal protein, pig breeding is developed due to its profitability and economic viability, becoming a fundamental link for obtaining protein food in the short and medium term.

In the current conditions of pig castle production, where small yards play an important role, sometimes in populated areas, it is necessary to make adjustments in the production technologies that have been applied in previous stages. These technologies cannot be sustained by importing cereals; there must be a national food base that supports the intention of the Ministry of Agriculture to increase pork production in Cuba significantly in the coming years.

Currently, several researches are being developed focused on feeding monogastric animals to increase the nutritional value and reduce the nutritional limitations of different products. One of these alternatives is through fermentation, through which energy-protein foods can be obtained, biotransformed in their different variants, which include energy and protein sources to improve the quality and digestibility of the product being fermented (Medina González et al., 2019, p. 79).

Probiotic additives contain live beneficial microorganisms which, when included in the diet in adequate amounts, have a positive impact on the health of the host. However, high costs have limited their use by pork producers in developing countries (Miranda Yuquilema et al., 2018, p. 69).

Among the objectives that should be highlighted in the training of producers, should be those related to the feeding of pigs, pointing out the use of herbaceous, shrub and forest sustainable agroforestry systems, located mainly in the community or its surroundings, as well as the use of by-products of local productions.

An alternative to promote growth in farm animals is the addition of phytochemicals and secondary metabolites from plants to feed; within this group, there are tannins; these are polyphenolic compounds, used by plants as a defense mechanism against predators. Tannins in high concentrations decrease feed consumption, which has been observed with concentrations greater than 5% of dry matter in the diet. This is due to their bitter taste and astringent capacity, which decreases the acceptance of the ration. However, at low concentrations they improve weight gain in rabbits, chickens and pigs.

It has been observed that hydrolysable tannins have antimicrobial activity, mainly against Gram-positive bacteria, which causes changes in the permeability of the cell membrane with the consequent decrease in cell volume, which is important to consider in order to improve the productive response of animals raised intensively and under adverse environments (Aguirre Meza et al., 2016, p. 57).

Other authors consider advantageous the additional supplementation with 100 mg of Zn from Zinc Methionine during the gestation-lactation phase, because they report that studies show that it helps to reduce mortality in the initiation stage, in piglets raised in warm weather (Romo Valdez et al., 2018, p. 68).

In general, good practices should be taken into account that are adjusted to the characteristics of the context, adapting them to the particular conditions of each producer, in order to ensure that science and accumulated knowledge are properly used.

III. In the care of environmental hygiene

Pig breeding is one of the most environmentally aggressive production activities because it generates highly contaminating waste and requires large volumes of water. These are two essential aspects that must be addressed in the training of producers, offering viable alternatives to be implemented in breeding, in environments close to large population groups.

It is necessary to highlight that, among animal wastes, the pig is the most polluting and one of the causes lies in the fact that nearly 40% of the microflora in the waste water of pig farms, where wastes are deposited, is made up of pathogenic bacterial species.

Researchers believe that although this practice is harmful, it continues to develop, so as long as there is a supply of meat to meet demand, producers must be trained in these issues so that the effects of their farming are minimized as much as possible.

Thus, this article aims to design a system of training workshops for pig producers, the Popular Council Minas de Matahambre, developed by the Municipal University Center.

MATERIALS AND METHODS

The present research is mixed with emphasis in the qualitative description of the object of study, for which a series of methods of the theoretical and empirical level and techniques of the descriptive statistics were used, which results were interpreted with a dialectical-materialistic conception. The methodology followed is explained below:

- Historical-logical: used to determine the foundation and historical evolution of the training process of the independent pig producers of the Minas de Matahambre Popular Council, from the Municipal University Center.
- Content analysis: used mainly to analyze the coherence of ideas and to obtain theoretical information for the preparation of the Workshop System.
- Analytical-synthetic: for the characterization of the object of research and its peculiarities in the Minas de Matahambre Popular Council.
- Generalization: in the design of the System of Workshops from the Municipal University Center for the qualification of the independent producers of pigs, of the Popular Council Minas de Matahambre.

- Survey: to collect the criteria of the independent pig producers of the Minas de Matahambre Popular Council about the breeding process and training needs.
- Interview: to deepen their knowledge about pig breeding.
- Observation: to reveal the strengths and weaknesses in the production process of the independent pig producers of the Consejo Popular Minas de Matahambre and in the training activities developed by the CUM.
- Descriptive statistical techniques such as the calculation of percent, used for the analysis of the representativeness of the results and their proportion with respect to the population.

For the present study, the 14 independent pig producers of the Minas de Matahambre Popular Council were taken as population; as an intentional sample, 5 independent producers were selected who live in the central area, adjacent to the CUM, of the head town.

RESULTS AND DISCUSSION

The methods described above enabled the collection of information needed to characterize the problematic situation associated with insufficient theoretical and empirical knowledge, as well as about the minimum material conditions in the people who practice pig farming in their homes. Table 1 shows the results of a survey applied to the five pig producers in the urban area of the Minas de Matahambre Popular Council:

Table 1 - Results of the survey to independent producers before the implementation of the Workshop System

Indicators	Options	Yes	No
School level	University		
	Pre-University or Technical Professional Education Graduate	**20%**	
	Secondary	**60%**	
	Primary	**20%**	
Level of conditions to develop the breeding	1- Solidly built pen		**20%**
	2- Adequate treatment of solid and liquid waste		**40%**
	3- Corral at a prudential distance from the town center		**100%**
	4- Water for consumption and sanitation		**100%**
	5- Safe and balanced feeding		**100%**
Level of productivity achieved	A quarterly pig over 150 pounds		
	A half-yearly pig over 150 pounds	**60%**	**40%**

	An annual pig over 150 pounds	**20%**	
	Pigs that do not reach 100 pounds in any time period	**20%**	

Source: Created by the authors

It was very important from the researchers' point of view that the PIC recognized their insufficient knowledge of pig management, which was reflected in their answers to the Interview, whose only question was about the previous knowledge they possessed before engaging in this work and that which they had acquired up to the time of the inquiry. The 80% said that they knew nothing in theory about it and that they limited themselves to doing what they had seen others do (empirical observation), while 20% (1) had read something in Wikipedia. Their answers coincided with the results of observation in the practice of the productive process.

No less relevant is, in this study, the direct approach to the breeding conditions that the referred producers have, who develop the activity, in sites close to large population centers. Table 2 shows the results of the application of the observation guide, prepared for this purpose, whose essential aspects can be consulted in the Indicator column of the table.

Table 2 - Observation of farming conditions of independent producers prior to the implementation of the Workshop System

Indicator	Existing conditions	Yes	No
Level of conditions available for the development of pig breeding	1- Solidly built pen	**20%**	**80%**
	2- Adequate treatment of solid and liquid waste	**20%**	**80%**
	3- Pen at a safe distance from the town center		**100%**
	4- Water for consumption and sanitation		**100%**
	5- Safe and balanced feeding		**100%**

Source: Created by the authors
Note: The conditions of the 5 members of the sample were observed

Finally, the information obtained from the application of the Observation Guide to the Training Activities developed by the CUM of Minas de Matahambre with these producers is shown (Table 3), which reveals a series of difficulties such as the non-compliance with the established schedules, to cite only one example.

Table 3 - Observation of training activities, given to producers by the CUM before the implementation of the Workshop System

Indicators	Options	Yes	No
	1- The training schedule is met	**20%**	**80%**

Level of implementation of the training process	2- The objective of the process is fulfilled	**40%**	**60%**
	3- The contents selected according to the diagnosis are addressed		**100%**
	4- The results of the evaluation system demonstrate adequate levels of learning	**20%**	**80%**
	5- Participants and community express a high state of satisfaction with the process	**20%**	**80%**
Level of control of the training process. It is controlled by the management of the CUM	1- Compliance with the training schedule	**20%**	**80%**
	2- The quality of the activities carried out	**20%**	**80%**
	3- The assistance of all the actors involved (teachers, producers and community managers when necessary)	**20%**	**80%**
	4- Ethics and professional performance of teachers	**100%**	
	5- The impact of the process on the community	**20%**	**80%**
Level of evaluation of the theoretical learning process	1- The systematic evaluation is fulfilled	**40%**	**60%**
	2- The partial evaluation is fulfilled	**40%**	**60%**
	3- The final evaluation is fulfilled	**100%**	
	4- The evaluation responds to the real needs of the producers	**20%**	**80%**
	5- The evaluation has a high educational and practical content	**20%**	**80%**

Source: Created by the authors
Note: 5 activities were observed

These results by indicator allowed to evaluate the process as follows:

Characterization of the preparation of independent producers

It was found that, of the five independent producers that constitute the sample, only one has an average level of education, the remaining four have a low one, for 80% (Table 1), which coincides with the knowledge about the management of the pig mass that is also deficient, since only one producer (20%) of the 5 interviewed refers to having carried out bibliographical searches, but in a tool considered not very scientific, as it is the case of Wikipedia.

The conditions available to develop the breeding are low in 100% of the sample, the most deficient being the lack of water for consumption and sanitation and the unavailability of safe and balanced feed (Table 2). As for the production levels, they are distributed between medium (60% of the sample) and low (40% of the sample) as can be seen in the third indicator in table 1.

In the observations to the training activities given by the CUM to the PIC (Table 3), it could be seen that the level of implementation of the training process presents serious difficulties since the schedules agreed upon by the actors involved (teachers and producers) are only complied with in 20% of the activities and the objective outlined in each of the actions is reached in 40%, without ever addressing the core contents according to the diagnosis and only 20% of satisfaction with the process is shown.

The level of control by the management of the CUM over the training process shows that only 20% of the activities have the required quality, with the due attendance of all those who should be present, only on 20% of the occasions and only 20% of impact on the community (second indicator, table 3).

The level of evaluation of the theoretical learning process (the most deficient knowledge, according to the Interview) reveals that during the training process only 40% of the activities are systematically and partially evaluated, which makes it difficult to achieve real transformation in the producers, both individually and in groups, and what is worse, only 20% of them respond to the real needs of those who receive them and fulfill their educational and practical function.

This situation leads researchers to consider the need for an intervention that contributes to solve the scientific problem observed, so a System of Workshops was designed for the training of PIC, from the Municipal University Center that is presented below:

Training workshops for the PIC of the Minas de Matahambre Popular Council

The following workshops constitute models that will be adapted to the particular needs and contexts in which the proposal is implemented, since, to the extent that the diagnosis indicates more or less needs, they should be adjusted.

General objective: Train independent pig producers in the municipality of Minas de Matahambre on biosecurity measures and sustainable management of the pig population.

Workshop No. 1

Objective: Identify the Pig Farming Systems, from the classification made in the book "Zootecnia Especial", in order to allow the independent pig producer (level of application or know-how, depending on the author assumed) to choose the most suitable system, adjusted to their specific feeding conditions and pig breed.

Content: The Intensive System of Pig Farming (Cochiquera or Granja Porcina) and the Extensive System of Pig Farming (Potrero) Breeds that predominate in each Exploitation System. Examples of pig breeds. Feeding and management to be taken into account in each Farm System in order to contribute to the efficiency of the productive processes in the PIC.

Methods: Presentation and interactive debate.

Teaching aids:

- Photos and posters of different types of Pig Farming Systems
- Board
- Book: Instituto Nacional de Recursos Agrarios, 1965. Zootecnia Especial. Curso básico pecuario. Ganado Porcino. INRA. Habana. Cuba

Evaluation: It will be carried out at the end of the workshop by means of oral questions, referring to the characteristics of the Pig Farming Systems and checking, in practice, the transformation achieved in the independent pig producers present in the workshop.

Workshop No. 2

Objective: To analyze the parts and functions of the monogastric digestive system of the pig by working independently to achieve the correct nutrition.

Contents: The parts and functions of the digestive system of the pig (Monogastric).

Methods: Presentation and interactive debate.

Teaching aids:

- Board
- Posters and photos showing the parts and functions of the pig's digestive system

Evaluation: This will be done at the end of the workshop by means of oral questions, referring to the parts and functions of the pig's digestive system and checking, in practice, the transformation achieved in the PIC.

Workshop No. 3

Objective: Characterize sanitation measures in pig farming, based on the book "Zoohigiene" and practical experience by working independently to improve the management of this aspect in PIC.

Contents: Clean-up measures in pig farming in order to contribute to the efficiency of production processes in CIPs.

Methods: Presentation and interactive debate.

Teaching aids:

- Board
- Book: Instituto Nacional de Recursos Agrarios, 1965. Zoohigiene. Curso básico pecuario. Ganado Porcino. INRA. Habana. Cuba

Evaluation: This will be done at the end of the workshop by means of oral questions, referring to the sanitation measures in pig farming and checking, in practice, the transformation achieved in the PIC.

Workshop No. 4

Objective: Characterize waste management in pig farming by PIC through participant observation to achieve improvement of this process in practice.

Contents: Wastewater management: construction of drainage and treatment systems Craft options. Solid waste management: biodigesters, their usefulness.

Methods: Presentation and interactive debate.

Teaching aids:

- Photos and posters of different types of liquid and solid waste processing systems (The biodigesters).

Evaluation: This will be done at the end of the workshop by means of oral questions, referring to the different waste management systems and checking, in practice, the transformation achieved in the PIC.

Workshop No. 5

Objective: Classify foods by origin and nutritional value (Digestibility; Palatability; Chemical composition and Quality of protein) on the basis of the text "Nutrition and Feeding" by working independently on the appropriate application of PIC feeding to the pig mass.

Contents: Foods by their origin and nutritional value (Digestibility; Palatability; Chemical composition and Quality of protein).

Methods: Presentation and interactive discussion.

Teaching aids:

- Board
- Posters
- Book: Instituto Nacional de Recursos Agrarios, 1965. Nutrición y alimentación animal. Curso básico pecuario. Ganado Porcino. INRA Habana. Cuba

Evaluation: This will be done at the end of the workshop by means of oral questions, referring to the classification of foods by their origin and nutritional value (Palatability; Digestibility; Chemical composition and quality of the protein) and checking, in practice, the transformation achieved in the PIC.

Workshops No. 6

Objective: Identify the nutrients that make up food from the book "Nutrición animal", by working independently to achieve an appropriate balance of the pig diet by PIC.

Contents: Characteristics and functions of energy and non-energy nutrients for pigs.

Methods: Presentation and interactive debate.

Teaching aids:

- Board
- Photos and posters representing foods in which each nutrient studied is present in large proportions (%)
- Book: Instituto Nacional de Recursos Agrarios, 1965. Nutrición y alimentación animal. Curso básico pecuario. Ganado Porcino. INRA Habana. Cuba

Evaluation: This will be done at the end of the workshop through oral questions, referring to the functions of energetic and non-energetic nutrients for pigs and checking, in practice, the transformation achieved in the PIC.

Workshop No. 7

Objective: Assess the importance of maternal colostrum for pig breeding, based on the text "Manual de Tecnologías Agropecuarias" through independent work for compliance with this aspect by the PIC.

Contents: Importance of maternal colostrum for pig breeding. Its nutritional composition and its contribution to the efficiency of production processes.

Methods: Presentation and interactive debate.

Teaching aids:

- Board
- Book: Manual de Tecnologías Agropecuarias (1985). Editorial Ciencia y Técnica, La Habana, Cuba

Evaluation: It will be carried out at the end of the workshop by means of oral questions referring to maternal colostrum for pig breeding, as well as its nutritional composition and checking, in practice, the transformation achieved in the PIC.

Workshop No. 8

Objective: To assess the delivery and newborn care system, based on the text "Manual de Tecnologías Agropecuarias" through independent work for the appropriate development of this aspect by the PIC.

Contents: The delivery and newborn care system. Care of the mother and the children in order to contribute to the efficiency of the productive processes.

Methods: Presentation and interactive debate.

Teaching aids:

- Board
- Book: Manual de Tecnologías Agropecuarias (1985). Editorial Ciencia y Técnica, La Habana, Cuba

Evaluation: This will be done at the end of the workshop through oral questions on the delivery and newborn care system. Care of mother and child and testing the transformation achieved in ICPs in practice.

Workshop No. 9

Objective: Analyze the following efficiency indicators: Births/sows/year; Average daily gain; Age at 90 kg, from the text "Special animal husbandry" by working independently to achieve adequate monitoring of pig reproduction by PIC.

Contents: Efficiency indicators: Births/sows/year; Critters per birth; Critters and weight at weaning. Meat production / sow / year; Average Daily Gain; Feed conversion; Age at 90 kg in order to contribute to the efficiency of production processes.

Methods: Presentation and interactive debate.

Teaching aids:

- Board
- Book: Instituto Nacional de Recursos Agrarios, 1965. Zootecnia Especial. Curso básico pecuario. Ganado Porcino. INRA. Habana. Cuba

Evaluation: This will be done at the end of the workshop through oral questions, referring to the Pig Efficiency Indicators and checking, in practice, the transformation achieved in the PIC.

Workshop No. 10

Objective: Analyze the biosecurity measures to be taken into account in the breeding of this livestock, based on the Legal Base of Pigs (Resolution 23/97) through independent work for their compliance with the PIC.

Contents: Existing procedural rules setting out the duties and rights of PIC with regard to the implementation of biosecurity measures to be taken into account in the rearing of these livestock.

Methods: Presentation and interactive debate.

Teaching aids:

- Resolution 23/97 of the Ministry of Agriculture. Havana, Cuba

Evaluation: This will be done at the end of the workshop through oral questions, referring to the indicators of biosafety measures and checking, in practice, the transformation achieved in the CIP.

Workshop No. 11

Objective: Explain the methods to be applied in the pig breeding process and the management of newborn piglets, based on the text "Zootecnia especial" by working independently to achieve adequate monitoring of pig breeding by PIC.

Contents: Methods of selection of females in heat. Care of the pregnant female. Attention to the birth and newborn. Cleaning of the pups, disinfection of the navel, and removal of the tusks. Shelter (comfortable and warm), colostrum intake, application of dextran with iron, castration. Weaning (age and weight).

Methods: Presentation and interactive debate.

Teaching aids:

- Board
- Book: Instituto Nacional de Recursos Agrarios, 1965. Zootecnia Especial. Curso básico pecuario. Ganado Porcino. INRA. Habana. Cuba
- Posters y photos of the pig shelters at the swine center

Evaluation: This will be done at the end of the workshop by means of oral questions, referring to the selection of the females in heat and checking, in practice, the transformation achieved in the PIC.

Workshop No. 12

Objective: Characterize the management and zootechnical attention of the breeders, as well as the characteristics of a good reproducer, from the book "Zootecnia especial" through the independent work for the achievement of the adequate follow-up to the reproduction of the pigs by the PIC.

Contents: Management and zootechnical care of the breeders. Its classification: piglets, empty sows, covered sows (pregnant) and nursing. Characteristics of a good swine breeder.

Methods: Presentation and interactive debate.

Teaching aids:

- Board
- Book: Instituto Nacional de Recursos Agrarios, 1965. Zootecnia Especial. Curso básico pecuario. Ganado Porcino. INRA. Habana. Cuba
- Posters

Evaluation: It will be done at the end of the workshop through oral questions, referring to the characteristics of a good breeder and checking, in practice, the transformation achieved in the PIC.

Results obtained with the implementation of the Workshop System

From the moment of the call to the System of Workshops, the aim was for participation to be conscious and voluntary, so that those involved would see in each action a response to their needs.

When the application was concluded, in which 12 producers took part, of the 14 that make up the total population, the study was repeated to the 5 that made up the initial sample; the figures showed an improvement in the indicators (Table 4).

Table 4 - Results of the survey and observation to independent producers after the implementation of the Workshop System

Indicators	Options	Yes	No
Level of conditions to develop the breeding	1- Solidly built pen	**100%**	
	2- Adequate treatment of solid and liquid waste	**80%**	**20%**
	3- Corral at a prudential distance from the town center	**40%**	**60%**
	4- Water for consumption and sanitation	**60%**	**40%**

	5- Safe and balanced feeding	**20%**	**80%**
Level of productivity it achieves.	A quarterly pig over 150 pounds		
	A half-yearly pig over 150 pounds	**80%**	**20%**
	An annual pig over 150 pounds	**20%**	
	Pigs that do not reach 100 pounds in any time period		

Source: Created by the authors

PIC that did not yet have concrete block pens and a cement floor, drainage and water system were built, which substantially improved the hygienic-sanitary conditions of the productive environment, although the availability of water remains the greatest difficulty, but conditions have been created to bury solid waste and make the best use of the water available.

One of the producers (20%) began planting protein plants to incorporate them into the diet of their pigs and made cassava yogurt for this purpose. The others are working on obtaining information and resources to improve the diet of their pigs.

There has been a slight improvement in the level of productivity, which should progress as the creation of food for the pigs is improved from harvest waste and other household waste, to which zeolite and fish waste are added as a source of protein that is easy to obtain in the geographical area where the People's Council is located.

The management of the People's Council demarcated an area far from the urban center where producers interested in starting this activity can locate their pens.

Working links have been established between the CUM and the PIC, which approach the former to request information on new production practices and experiences of science in the different aspects included in the management of the pig mass.

This experience was a good practice systematized by its acceptance in the referred People's Council by:

- The practical significance of this result was materialized in the elaboration of the System of Workshops from the Municipal University Center for the training of the independent pig producers of the Minas de Matahambre Popular Council, which contributed to the care of the environment, as well as to the economic and alimentary development of the community.
- The novelty of the experience of training of independent pig producers, achieved through socializing actions of livestock technical knowledge, which exceeds the current conceptions of the process of pig production in the community.
- The scientific actuality of the experience, which constitutes a way of concretizing the call of the State and the Cuban Government to the search of solutions to the problems of the community from the Universities and with the application of

scientific methods, through the introduction and generalization of the research results.

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Authors declare not to have any conflict of interest.

Authors' contribution:

The authors have participated in the writing of the paper and the analysis of the documents.