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### USE OF WATER IN SWINE PRODUCTION IN CATALONIA-SPAIN

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**ABSTRACT** The objective of this work was to evaluate the use of water in the swine production in the region of Catalonia, Spain. The evaluation was realized through a questionnaire with 200 producers using different production systems. The water source, type of fountain, frequency of maintenance and repair of the fountain as well as cleaning frequency of swine housing was evaluated. The data obtained were expressed in percentage and presented in graphs for better characterization of the study. In relation to water source, 49% of water used in pig farms was from an irrigation system, 26% from the municipal system and 15% was from groundwater sources. Most of the fountains used were nipple bowl fountains that represented 77%, constant valve fountains (10%), trough (10%) and nipple fountains (3%). The frequency of maintenance and repair was daily (95%), weekly (4%) and monthly (1%). The frequency of cleaning of swine housing was 89.4% after the production cycle, 7.1% monthly, 3.2% weekly and 0.3% daily. The water uses in pig farms in Catalonia are adequate for production purposes, but there are some factors that could be improved to optimize water usage within an environmental perspective.

**Keywords:** Cleaning of swine housing, Nipple drinker, Swine production, Water source.

**INTRODUCTION** Water is a fundamental and indispensable resource in swine production. For that reason it's necessary to know the strategies of water use to avoid losses and environmental contamination by the increased production of slurry. In pig farms water use is distributed among the consumed by animals, used for cooling and serving for cleaning of swine housing.

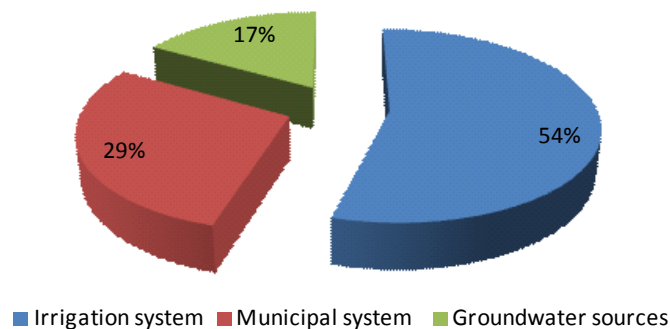
Some of the alternatives to reduce the amount of wasted water that can contribute to the increase of slurry, consequently, the environmental contamination are: to know the origin of water used on the pig farm, reduce waste of water using correctly the drinkers for each

creation phase, calibrate and repair the drinkers where necessary and to maintain a frequency of cleaning the swine housing with the use of equipment that consume little water (Babot *et al.*, 2004).

For that reason, it's necessary to know the strategies of water use to avoid losses and environmental contamination by the increased production of slurry. Thus, the objective of this work was to evaluate the use of water in the swine production in the region of Catalonia, Spain.

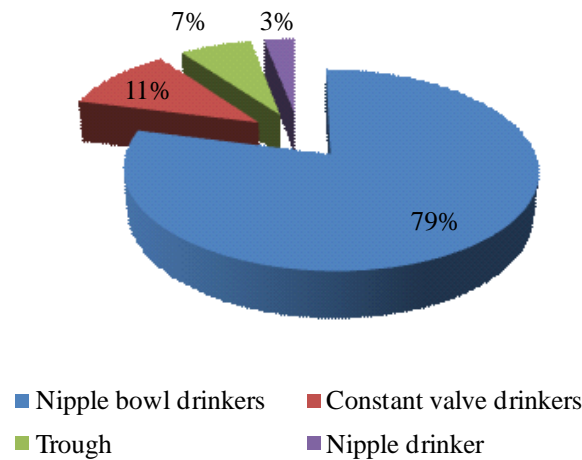
**MATERIAL AND METHODS** The research data were collected from different pig farms located in Catalonia, northwest Spain, in the years 2006 and 2007. For this, a questionnaire was elaborated with the objective to know how water is distributed and used in swine production in the region. Two hundred pig farms with different production systems participated of the research. Owners or technical responsible of the farms were interviewed in this study. The questionnaire contained closed questions, with alternatives to choose about the water source on the farms, type of drinker used in their production systems, frequency of revision and repair of drinkers and frequency of cleaning the of swine housing. The informants were coded to ensure anonymity and consent for the interviews was obtained after verbal explanation of the objectives and purposes of the study. The data obtained were expressed into percentage and presented in graphics for better characterization of the study.

**RESULTS AND DISCUSSION** We can see in the graphic 1 that in relation to water source, almost 50% of water used in pig farms was from the irrigation system and 26% from the municipal system and 15% was from groundwater sources. This is because most farms are situated in rural lands away from de cities and is economically expensive to bring the municipal water to these properties. The water of dubious origin should be treated to avoid problems with the health of animals and, in addition, the water must be evenly distributed at all points of consumption and be accessible to all animals with troughs suitable for the age of the animals (Babot *et al.*, 2004).



Graphic 1 – Water source used in pig farms.

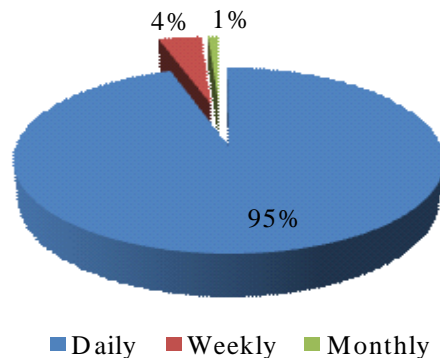
As important as knowing the water source that supplies the farms is to know what kind of drinker is most used by these farms. According to the graphic 2, most of the drinkers which used were nipple bowl drinkers that represent 77%, constant valve drinkers (10%), trough (10%) and nipple drinker (3%). According to Torrey *et al.* (2008), drinkers of type bowl reduce the waste of water, while the nipple drinkers increase the amount of water wasted by animals.



Graphic 2 - kind of drinker most used at pig farms.

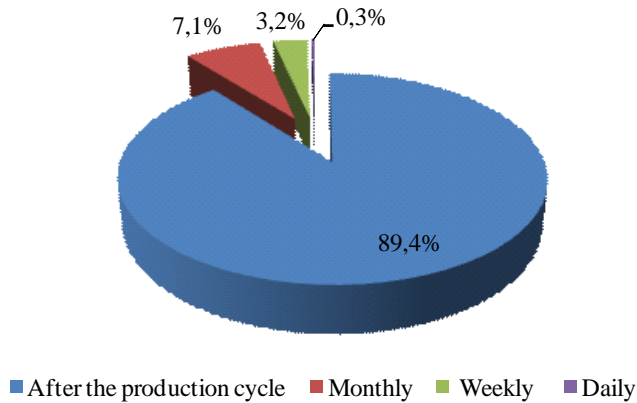
The type of drinker used can give us an idea of the efficiency of water use, since the drinker that have a system to collect water, such as type bowl drinker, has a lower water loss. According to the MAPA (2006), the use of these drinkers reduces water consumption by 24% compared to drinker like a nipple, with a reduction of 5 to 14% of the volume of slurry produced. It is very important avoid wasting water, besides being a scarce resource, its waste contributes to the increased volume of slurry and, consequently, increased storage costs, treatment, transport and distribution of them.

In graphic 3 we find the answers when asked about the frequency of revision and repair of drinkers. Ninety-five percent of respondents who daily make a review and / or repair of drinkers, 4% do it weekly service and 1% monthly. The review and identification of daily problems with drinkers can avoid waste and increase in water consumption, which can triple depending on the malfunction of the supply system MAPA (2006). In addition, waste water will have a direct reflection in the low water consumption by animals, which will affect directly the performance of these reductions in weight gain and feed efficiency (Polinutre, 2001).



Graphic 3 - Frequency of revision and repair of drinkers.

To optimize the management within a farm, the cleaning of swine housing is held at the end of each production phase (89.4%) as can be seen in graphic 4.



Graphic 4 – Frequency of cleaning of swine housing

However, the frequency of the cleaning of swine housing will depend on the stage of creation in which these animals are, because in some cases, such as stage of gestation, the facilities are never completely empty, as in other stages of production where we work with systems creation “all in - all out”. An alternative is to do a cleaning before cleaning with water. The use of an adequate cleaning system, for example, the use of equipment with high pressure, can provide a significant water savings. This practice can reduce 25 to 40% the consumption of cleaning water, which implies a reduction of 2 to 9% of waste produced (MAPA, 2006), for cleaning water used can increase the volume of slurry to be treated and/or stored.

Another factor that must take into consideration are the chemicals products used for cleaning and disinfection of swine housing, they will be incorporated into slurry and therefore, likely to reach the environment.

**CONCLUSION** The water uses in pig farms in Catalonia are adequate for production proposes, but there are some factors that could be improved to optimize water usage within an environmental perspective.

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## REFERENCES

- Babot, D., N. Andrés, L. de La Peña, E.R. Chávez. 2004. Técnicas de gestión medioambiental em producción Porcina. Proyecto TRAMA. Departament de producció animal. UdL. Lleida. pp 135.
- MAPA. 2006. Guía de mejores técnicas disponibles del sector porcino. 2006. 137p.
- Polinutre. 2001. Água durante a gestação e lactação das matrizes suínas. Available in: <[http://www.polinutri.com.br/conteudo\\_artigos\\_anteriores\\_fevereiro.htm](http://www.polinutri.com.br/conteudo_artigos_anteriores_fevereiro.htm)> . Accessed: 15/02/2010
- Torrey, S., E. L. M. Toth Tamminga and T. M. Widowski. 2008. Effect of drinker type on water intake and waste in newly weaned piglets. J. Anim. Sci. 86:1439-1445.