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Swine production on Maio Island, Cape Verde: a household survey

Sistemas de produção de suínos na Ilha do Maio, Cabo Verde: um inquérito

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Summary: The main objective of this work was to describe the swine rearing systems used in Maio Island, Cape Verde. An additional objective was to describe swine´s health problems as felt by their owners, in order to understand their perception on the importance of future interventions to improve animal health. The study was carried out in the course of Vétérinaires Sans Frontières - Portugal mission in October 2012. A household survey was conducted in 6 of 12 localities of the island. In a total of 1526 households, 305 swine producers were identified with an average of 4.24 (SD 3.35) animals per producer. Results showed that piglets (53%) and sows/gilts (32%) represented the main age and sex groups. Regarding the rearing system, 57% of owners reported that their animals were confined in piggeries, 34% had free access to the streets and only 9% lived in backyards. A total of 268 animals were reported to die from 2010 to 2012. Although the majority of swine producers (88%) do not report any clinical signs prior to the animal's death, tremble, hyperemia of the skin, abortion, recumbence and respiratory distress were described for some cases. The symptoms described by producers may indicate the presence of certain infectious diseases, such as African Swine Fever, easily spread in low biosecurity systems. However, other causes such as toxic plants, should be consider since mortality occurred mainly in the warmest months, coinciding with the rainy season when many producers free their animals to feed of existing plants in the fields. Future strategies would benefit from laboratory investigation in order to identify causes of swine mortality.

Resumo: O principal objectivo do estudo foi conhecer quais os tipos de sistemas de criação utilizados para suínos na Ilha do Maio, Cabo Verde. O segundo objectivo foi identificar os principais problemas de saúde na ilha com vista a defenir futuras estratégias para melhorar a saúde pública e animal. Os dados foram recolhidos durante a missão dos Veterinários Sem Fronteiras-Portugal em Outubro de 2012. Foram realizados inquéritos em todas as habitações em 6 de um total de 12 localidades. Foram identificados 305 criadores de suínos num total de 1526 habitações, sendo o número médio 4.24 (SD 3.35) animais por criador. Os resultados mostraram que os leitões (53%) e as fêmeas adultas (32%) representavam a maioria da população. Em relação aos sistemas de criação, 57% dos criadores tinham os seus animais em currais, 34% tinham em liberdade e 9 % em quintais. Um total de 268 animais morreu entre 2010 e 2012. Embora a maioria dos proprietários (88%) não identificasse sinais específicos aquando a morte dos animais, a presença de tremores, hiperemia da pele, aborto, decúbito e dificuldade respiratória foi descrita em algumas situações. Os sinais descritos pelos proprietários podem indicar a presença de certas doenças infecciosas, facilmente transmitidas pela criação dos animais em liberdade, sendo a principal suspeita local a Peste Suína Africana que se propaga facilmente em sistemas de criação com poucas medidas de biosegurança. Existem no entanto outras possibilidades devem ser consideradas, como por exemplo o consumo de plantas tóxicas, pois os surtos de mortalidade ocorreram principalmente nos meses mais quentes e chuvosos, quando os proprietários libertam os seus animais para se alimentarem nas pastagens. O diagnóstico dos surtos requer assim que se recorra a exames laboratoriais e a uma recolha sistemática de dados.

Introduction

Swine are kept by a large number of families in Cape Verde due to its importance as a source of high quality protein and as an easily mobilised source of money.

A survey conducted in Cape Verde in 1994-1995 showed that the most common swine rearing systems were free-ranging and small piggeries; intensive farming systems represented less than 0.5% of the total pig farmers in all Cape Verde islands (Ministério da Agricultura, Alimentação e Ambiente de Cabo Verde, 1998).

Free-ranging swine can be found wandering in search for food and may be also fed by their owners. This supplement is usually provided to females during lactation and to pigs at fattening. Animals have usually low carcass weight, and health problems are frequent (Ministério da Agricultura, Alimentação e Ambiente de Cabo Verde, 1998).

Piggeries, which might belong to a family or to a community, are usually located to the villages and could be concentrated or dispersed in one area. The animals are fed with kitchen swill, bran or corn, and occasionally other by products from agriculture. The Community piggeries are built on the outskirts of some villages (Vieira, 2013).

According to Sá Nogueira and Barbosa (2007), a total of 1,944 swine were present on Maio Island. The

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same authors reported that the main animal health-related economic losses in swine are caused by classical swine fever, African swine fever, cysticercosis, and swine erysipelas.

The first objective of this work was to describe swine rearing systems w in Maio Island, Cape Verde. The second objective was to describe swine´s health problems as felt by their owners, in order to understand their perception on the importance of future interventions to improve animal health.

Materials and methods

A survey was performed in the course of VSF-Portugal mission on the island from October 15th to 24th, 2012 in five of the 12 villages (Alcatraz, Calheta, Figueira da Horta, Morrinho and Morro) and one city (Porto Inglês); the transportation was provided by the Agriculture, Forestry and Animal Husbandry Services of Cape Verde. The villages were selected based on Livestock Services planned activities for those days.

A questionnaire (Annex 1) was design in order to register the number of swine for each holder, number of animals per gender and breed including their reproductive status. Type of rearing system and vaccination and deworming status was also recorded. Additionally, information regarding mortality in previous years was gathered, including how may animals died, what clinical signs were showed at the moment of death, in which months and the cause of dead.

The questionnaire was applied in all households in the six localities. The survey was carried out by one person and applied face-to-face and in Portuguese language to a single resident of each house. The houses were visited based on pre-defined tracks. Due to its dimension, Porto Inglês was divided into a set of sub-regions ("blocks") with 200 m size using Quantum GIS 1.8 software and Google™ Earth imagery. The response rate was 100%. It should be noted that some houses were abandoned or uninhabited. These situations were confirmed by local residents.

Due to the long distance between the localities and the piggeries, it was asked information about their animals not being possible to observe the animals.

The data was introduced into an Excel™ Spread Sheet and data management and analysis was performed in R (R Core Development Team, 2014).

Results

In a total of 1526 households, 305 (20%) have swine and the total number of pigs was 1294, with an average of 4.24 animals (SD 3.35) per producer, a minimum of 1, a maximum of 20, with the distribution showed in Figure 1.

Results showed that piglets (53 %) and sows and gilts (32%) represented the main age and sex groups. Males represented 15% of the total population, from which 33% were castrated (Table 1). These data result in 1.7 piglets on average per female (689/409) and 3.1 females per boar (409/132).

Regarding the habitat type, 57% of owners reported that their animals remain closed in piggeries, 34% have free access to the streets and only 9% lived in backyards. In these last two groups, 88% of the producers referred that their animals have contact with other species.

The main feed is kitchen swill, representing 78% of the answers. Only 2% of the producers feed their animals with commercial pig feed. The owners referred that animals were purchased or offered by relatives.

A total of 88 producers reported the death of 268 swine from 2010 to October 2012 (table 2). Only one owner in Morrinho reported that they animals died in 2010. Although 88% of the swine producers did not report any clinical signs when the animals died, the others reported tremble, hyperemia of the skin, abortion, recumbence, and respiratory distress at the moment of death.

The total number of dead swine was aggregated at the month level and results are presented in Figure 3. Mortality occurred between April and October in the 3 years, being September the month with higher mortality.

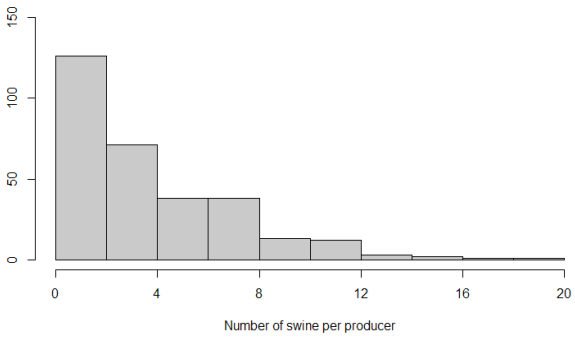

Figure 1 – Distribution of the number of swine per household.

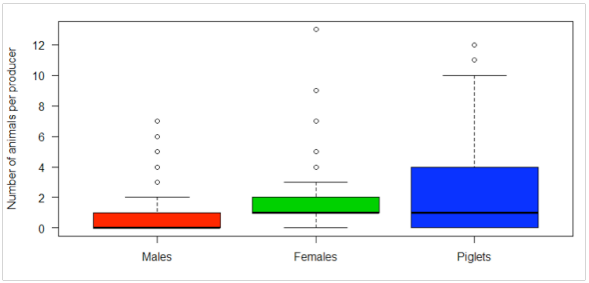

Figure 2 – Population structure: distribution of animal´s gender and age group per household.

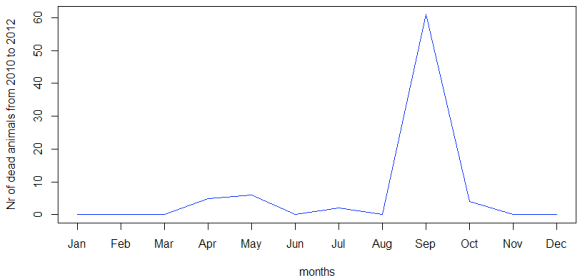

Figure 3 – Cumulative number of dead swine per month from 2010 to October 2012.

Table 1 - Swine herd characterization, type of habitat and contact with other species for each surveyed locality

Locality		Alcatraz	Calheta	Fiqueira da Horta	Morro	Morrinho	Porto Inglês	Total
Number of swine producers		11	66	82	19	36	91	**305**
Populations features per locality	Number of swine	30	222	330	95	156	463	**1294**
	Males	4	36	60	13	24	59	196
	Sows and gilts	9	82	88	33	59	138	409
	Piglets from both sex	17	102	182	49	73	266	689
Reproductive status (adults)	Barrows and stags*	0	20	30	8	2	4	64
	Pregnant	0	22	10	10	8	32	82
Habitat*	Piggery	9	34	32	7	26	67	175
	Yard	0	0	20	1	4	1	26
	Free access to the street	2	32	30	11	6	23	104
Contact with other species*		11	66	62	18	32	90	279
Feeding*	Kitchen swill	9	60	42	13	35	79	238
	Commercial feed	0	0	4	1	0	2	7
	Both	0	4	32	3	1	8	48
	Other	2	2	4	2	0	2	12

***Castrated animals.**

Table 2 - Reproduction status, mortality and clinical signs prior to dead of swine for the surveyed localities

	Locality	Alcatraz	Calheta	Fiqueira da Horta	Morro	Morrinho	Porto Inglês	Total
Health	Aborted	0	0	0	0	0	0	0
	Females infertility	0	0	0	0	0	0	0
	Got diseased	0	0	0	0	2	0	2
Number of dead animals	2010	0	0	0	0	30	0	30
	2011	7	44	42	8	20	30	151
	2012	13	12	4	21	0	37	87
Clinical signs present at the moment of death*	Abortion	0	2	0	3	0	0	5
	Loss of appetite	3	0	0	0	0	3	6
	Respiratory distress	1	0	0	0	0	0	1
	Hyperaemia of the skin	0	6	4	2	2	0	14
	Trembling	1	2	0	1	1	3	0
	Recumbence	0	0	0	1	0	1	2

***these results represent the number of owners whom reported these clinical signs.**

Discussion

Our objectives were to characterize swine production and to collect information regarding swine´s health on Maio Island, as perceived by their owners, in order to plan future interventions.

The survey revealed that sows/gilts and piglets represent the majority of swine on the island. The relatively low number of piglets per female and the small number of animals kept can be explained by the fact that a large percentage of these animals do not survive to adult age due the lack of feed, water, the presence of disease or other factors. Furthermore pork consumption is not common on the island, being pork only consumed during festivities.

Results showed that free-ranging and semi-intensive (piggeries) systems are present on the island. These types of rearing system are common in African countries (Muys and Westenbrink, 2004). Free-rearing systems are used when the animals are not kept to provide meat but as an insurance policy in situation that extra sources of money is needed or to be offered in special occasions such as weddings and other festivities (Muys and Westenbrink, 2004). The semi-intensive rearing systems allow to grow faster and healthier animals, due to better feeding and diseases controls, in larger litters and also reducing the risk of animals being stolen (Muys and Westenbrink, 2004). However, these semi-intensive systems are alternate with free-ranging during the year, which might result in higher mortality rates.

Intensive rearing systems were not found on the island probably as a result of the lack of resources for feeding and the presence of diseases that might have a negative impact on the business. However, it is possible to find this type of production in Santiago Island (Vieira, 2013).

The survey revealed that 78% of the swine holders feed their animals with kitchen swill and only 2% used commercial swine feed. Such facts portray the limited financial resources of families and the difficulties of finding in the Island alternative sources of feeding due to the lack of agriculture (the island is very dry) and lack of industry that produces stubbles or other subproducts suitable for animal feeding. Using kitchen swill to feed animals is common in free-ranging and semi-intensive (piggeries) systems in African countries (Muys and Westenbrink, 2004). The free-ranging system could increase diseases spread, such as African Swine Fever and Classical Swine Fever, as a result of the higher contact rate between animals and the access of pigs to waste. These diseases were reported in Cape Verde over the last decade (OIE a, 2015). Zoonosis such as cysticercosis and leptospirosis also reported in Cape Verde (OIE a, 2015) can also be transmitted to humans, through environmental contamination and the lack of hygienic conditions and sanitary inspection of slaughtered pigs and meat preparation. Swine slaughter in a slaughterhouse is not common because the process costs are high for families with small number of pigs, which represent the majority of rearing systems on this island.

The symptoms described by the owners such as abortion, loss of appetite, respiratory distress, hyperemia of the skin (particularly of the ears), tremble and recumbence, are similar to clinical signs of Classical swine fever (CSF) or African Swine Fever (ASF) (Radostitis *et al.*, 2000). Many swine holders reported that they free their animals during the "raining season" (August to October) to be feed by the vegetation, raising the potential contact with ticks (potential CSF/ASF reservoir) or with other infected swine.

The presence of ASF in at least part of Cape Verde, was confirmed several times. Circumstantial evidence indicated that ASF may have been present in Cape Verde since at least 1966. Since 1985 and up to the 1990'ies peaks of morbidity/mortality were observed twice a year, in spring and winter. Since 1998, FAO had been developing technical cooperation projects for control and eradication of ASF in Cape Verde. In January of 1998, an outbreak occurred on the main island, Santiago, and cases were confirmed from most parts of the island. Although there were no confirmed cases in the other islands, enquiries on Maio Island indicated that very high mortality had occurred among pigs during the latter half of 1997 and the early months of 1998 and owners reported clinical signs compatible with ASF (Penrith, 1998). The presence of this disease was also reported by FAO (2012) and Sá Nogueira and Barbosa (2007). The disease was again confirmed in 2015 in the island of Boavista (World Organisation for Animal Health – OIE (b), 2015).

Other important fact is that owners reported deaths occurring mainly in warmest months (from April to October, with the highest incidence in August and September). However, further investigation is needed to make conclusions regarding the cause of death; is not possible to exclude that mortality are caused by the ingestion of poisonous plants (Encyclopedia Britannica, 2014) or other agents. Future strategies could be focused in a surveillance system that early identifies the mortality outbreaks in order to develop laboratory and epidemiological investigations to identify the causes of swine's mortality and address them in a specific way.

Official importation of live animals is reputed to be minimal and, according to swine's owners no live pigs are imported. Penrith (1988) revealed in the enquiries on Maio Island, that the traffic of pigs between Maio Island and Santiago Island was reported by some owners.

Despite of the awareness of the population to the potential presence of certain diseases in the island, it is important to continue currently ongoing projects which address the training of farmers to recognize clinical signs, to report them to responsible authorities and to improve diagnosis, preventive and control strategies. In addition to these measures, permanent confinement of swine in piggeries, pens or sties should be strongly encouraged and feeding of raw swine swill to pigs should be actively discouraged.

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Annex 1 – VSF Portugal questionnare

VSF – ILHA DO MAIO / 2012 - Produção de suínos Ficha nº _____

Nome do dono:_____ Data ____/____/_____
Morada :_____ **Dados GPS**:_____

Número de suínos _____ **Machos**:_____ **Fêmeas**: _____ **Leitões**: _____
Machos castrados _____
Raça: Local / Outra →_____
Cor: _____

Habitat: Sempre na pocilga Sempre no quintal Com acesso à rua
Contacta com outros animais N S → Quais?_____
Alimentação: restos de cozinha e mesa / ração / outro Descrever: _____
_____
Vacinado .N…S Qual? _____Data_____/_____
Desparasitação interna N S → Qual? _____ Data _____/_____
Desparasitação externa N S → Qual? _____ Data _____/_____
Nº de abortos _____ **Nº fêmeas inférteis**_____
No ano passado quantos porcos ficaram doentes? _____ **Quantos morreram**? _____
Em que meses morreram? _____
Quais os sinais? _____
Qual a causa? _____
O que aconteceu aos porcos que não morreram? _____
Quantos porcos tinha no ano passado? _____
Qual a proveniência dos animais adquiridos?_____

OBSERVAÇÃO DOS ANIMAIS
Atitude: Algum dos animais demonstra apatia? N S
Estado geral do grupo: Magros / Normais / Gordos / Grupo heterogéneo
Fezes: Normais / Diarreicas → _____
Tem carraças? S N Observa picadas nos animais? N S → qual o insecto? _____
Sintomas Alterações respiratórias Alterações neurológicas Hemorragias: Local _____
Artrites Cianose Abcessos
Lesões Cutâneas Alopécia Descamação Espessamento Piodermite Hiperémia
Outras observações:_____