

RESEARCH NOTE

Behavior of grazing European wild boar (*Sus scrofa*) in a semi-extensive production system

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Abstract

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In the semi-extensive farming systems that are used to raise European wild boar in countries such as Chile, the behavior of the animals in paddocks has not been studied and is important for managing the system. The objective of the present study was to determine the proportion of time that grazing wild boar spent on different activities and the distribution of these activities during the day. The study was conducted in paddocks containing *Cynodon dactylon*, *Lolium perenne* and *Poa pratensis*. A total of 35 purebred European wild boars with a liveweight (average + SEM) of 37.4 + 1.11 kg with noserings were used in the study. The animals were in the paddocks from 08:30 h until 16:30 h, after which they had free access to a commercial diet for one hour and were kept in a barn until the following day. The activity of each animal was observed every 5 minutes throughout the grazing period, with the activities categorized as grazing, rooting (either with the snout or foot), walking, running, playing, lying down, drinking or other activities. Overall, throughout the grazing time, the animals spent 26% of their time grazing, 17% rooting, 7% walking, 3% playing, 2% drinking and 44% lying down. When the animals entered the paddock in the morning, they grazed intensively, as 74% of observations were of grazing during the first half hour. Gradually the observations of grazing decreased, reaching the lowest number between 12:00 and 12:30 h, when only one animal was observed to graze at one timepoint. The number of animals observed lying down gradually increased over the morning. In the afternoon, the proportion of animals grazing gradually increased, reaching a maximum of 27% of animals grazing at 15:00 h. Over an 8-hour period with access to pasture, European wild boar spent a significant amount of time grazing (26%). The intensity of grazing was high when they first entered the paddock and decreased gradually over the next four hours, increasing slightly again toward the end of the 8-hour period.

Key words: behavior observations, behavior patterns, European wild boar, grazing.

Introduction

Meat production from the European wild boar (*Sus scrofa* L.) in countries such as Chile has been increasing over the last decade, with a growing

market both in Chile and overseas. In addition to being chosen by consumers because of its characteristic taste, the meat is often marketed as a more healthy alternative to pork because of its lower levels of fat and cholesterol than meat from the domestic pig (3.09 vs. 5.66% fat in loin meat [de la Vega, 2003; USDA, 2004] and 45 vs. 101 mg cholesterol 100 g⁻¹ meat [Sudom *et al.*, 2001] from wild boars and the domestic pig, respectively).

The predominant production system used for the production of European wild boar in Chile is a semi-extensive system in which the animals have access to pasture during the day and receive a concentrated diet as a supplement, usually at the end of the day. In this production system, the animals have been shown to consume a nutritionally important quantity of pasture (Hodgkinson *et al.*, 2009), and it is estimated that growing wild boar (18 to 25 kg liveweight) reared in this system satisfy close to 90% and 45% of their daily maintenance digestible energy requirements through pasture consumption in Spring and Summer, respectively (Quijada *et al.*, 2012).

In the south of Chile, the annual rainfall varies between 1,200 and 2,500 mm per year. Under wet conditions, the impact of animals walking can result in significant damage to the soil and pasture (Greenwood and McKenzie, 2001; Menneer *et al.*, 2005). The more time that the animals are in the pastures, the greater the damage that can be expected to occur. This damage to the soil can result in a 25-40% decrease in pasture production (Cluzeau *et al.*, 1992; Singleton and Addinson, 1999; Nie *et al.*, 2001). The density of pasture decreases, and there is an increase in the presence of undesirable pasture species (Hutchinson *et al.*, 1995; Bilotta *et al.*, 2007).

Anecdotal observations of grazing wild boar in a pasture system during previous studies suggested that they graze intensively during approximately the first hour that they are in the paddock (typically these animals are housed in barns during the night), and then grazing tends to diminish. If this pattern is indeed the case, then it may be possible for the animals to spend the first part of the day in a good quality pasture and then be moved to a low quality "sacrificial" pasture for the remainder of the day to minimize damage to the good quality pasture due to treading. However, before such grazing management practices can be introduced, it is important to assess the amount of time that wild boar spend grazing and the distribution of this grazing during the day. Therefore, the objective of

the present study was to determine the proportion of time that grazing wild boar spend on different activities and the distribution of these activities during the day.

Material and methods

The methodology used in this study was approved by the Committee for the Ethical Use of Animals in Experiments of the Universidad Austral de Chile.

The study was conducted in a total of eight 175 m² paddocks containing 32% *Cynodon dactylon* (Bermuda grass), 25% *Lolium perenne* (perennial ryegrass), 19% *Poa pratensis* (bluegrass) and 24% dead material (on a dry matter basis). The paddocks were grazed with 17 animals in one paddock and 18 in another for three days in a row before changing over the paddock. The pasture plants were in the vegetative stage throughout the study. Water was freely available for the animals in each paddock.

The study was conducted during autumn (April 2009). A total of 35 purebred European wild boars with nose rings from a commercial farm were used in the study, with a liveweight (average + SEM) of 37.4 + 1.11 kg when the observations began. The animals were accustomed to a daily routine where they entered paddocks at 08:30 h and remained there until 16:30 h, after which they had free access to a concentrated commercial diet for one hour and then were kept in a barn until the following day. The commercial diet contained 17.85 MJ kg⁻¹ gross energy, 190 g kg⁻¹ crude protein, 79 g kg⁻¹ crude fiber and 15 g kg⁻¹ crude fat (values determined on a dry matter basis).

Before the observation period began, the appropriate distance between the observer and the animals was determined. It was important that the observer did not affect the behavior of the wild boar but could still identify individuals and their activity. The distance considered appropriate was that where the animals did not appear to be watching

the observer or remain facing the direction of the observer. A distance of approximately 15 m from the nearest paddock fence was used for observations.

The animals were randomly divided into six groups (five groups of six animals and one group of five animals). On each observation day, one group of animals was observed with each animal in that group observed during that day. The back of each animal observed was marked with an animal marking pen in such a way so as to permit the identification of the individual. During the observation days, the animal's activity was recorded every five minutes throughout the grazing period (8:30 h to 16:30), with the activities categorized as grazing, rooting (either with the snout or foot), walking, running, playing, lying down, drinking or other activities. Thus, a total of 96 observations were made of each animal during the grazing period. The total time that the animals spent on each activity was determined by adding the observations together.

The ambient temperature was recorded at 10 minute intervals throughout each grazing period at a meteorological station adjacent to the farm (Santa Rosa Research Station, Universidad Austral de Chile). The average, maximum and minimum temperature during each observed grazing period was also noted.

Analyses of variance were conducted using the program SAS (version 9.1.6) to determine whether the observation day (group) or the temperature (minimum, maximum or average during the day) affected the percentage of time that the animals spent doing different activities. A P value < 0.05 was considered statistically significant.

Results

The average daily temperature during the observation days ranged from 12.5 to 19.3 °C.

The animals had an average liveweight gain of $276 + 18.6 \text{ g day}^{-1}$ (mean + SEM) during the study.

There was no effect of day on the amount of time that the animals spent grazing ($P=0.08$), but there was an effect of day on the amount of time the animals spent rooting ($P \leq 0.0001$) and lying down ($P=0.004$). There was, however, no effect of temperature on the amount of time or percentage of time that the animals spent doing any of the activities ($P > 0.05$).

The time that the animals spent on the recorded activities is shown in Figure 1. They spent the majority of their time lying down (44.0%, equivalent to slightly over 3.5 hours during the eight-hour grazing period) and 25.5% of their time grazing (slightly over two hours of the eight hours).

For Figure 2, the day has been broken into half-hour periods and the percentage of all observations for all animals for each activity is shown. Each bar represents a total of 210 observations (six observations per animal, taken five minutes apart). Thus, the spread of the activities during the day are shown. As can be observed in Figure 2, when the animals entered the paddock in the morning, they grazed intensively, as 74% of the observations during the first half hour were of grazing. The majority of animals continued grazing, but grazing gradually decreased during the morning, reaching the minimum between 12:00 and 12:30, when only one animal was observed grazing at one timepoint. The number of observations of animals lying down gradually increased over the morning. Later, the proportion of animals grazing gradually increased, reaching a maximum of 27% of animals grazing at 15:00.

Discussion

In countries such as Chile, most wild boar farming uses a semi-extensive production system with access to pasture (Skewes and Morales, 2006). The

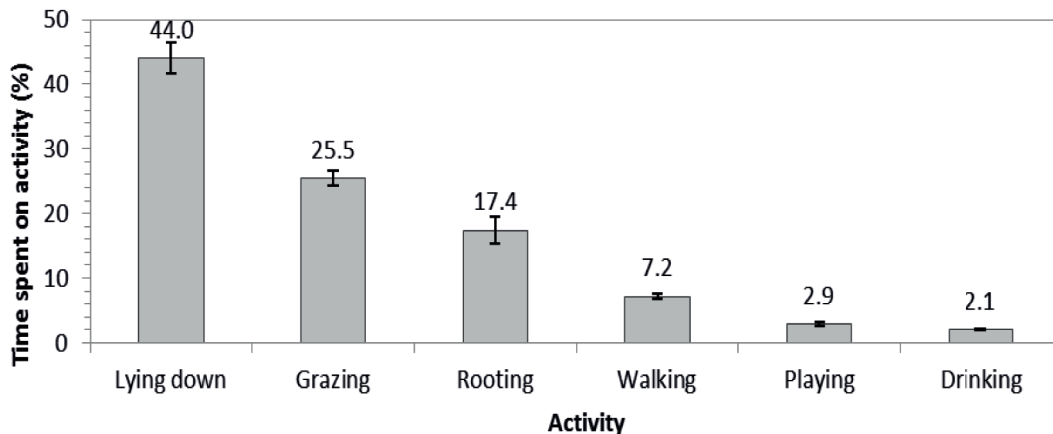


Figure 1. Percentage of time that wild boar in a grazing situation spend on different activities during an 8-hour grazing session (mean + standard error of the mean, n=35).

animals have been shown to consume a significant amount of pasture in this system (Hodgkinson *et al.*, 2009), which satisfies between 105% and 142% of the daily maintenance digestible energy requirements for these animals in Spring and over 50% of these requirements in Summer (Quijada *et al.*, 2012); therefore, pasture is important nutritionally for wild boar. This study is the first to follow the behavior of a group of growing European wild boar during an 8 hour grazing session, determining the amount of time that they spend grazing and the distribution of this time throughout the day.

The method used to record their behavior, where sequential observations are made of the animals throughout the day, is a standard method to record animal grazing behavior, particularly to study cow grazing behavior (Gary *et al.*, 1970; Phillips and Denne, 1988; Tharmaraj *et al.*, 2003). It has also been used previously to study the behavior of sows (Edwards *et al.*, 1996; Horrell *et al.*, 2001; Studnitz *et al.*, 2003).

Overall, the wild boars were observed to spend a significant amount of time grazing (26%). This finding is similar to the percentage of time sows

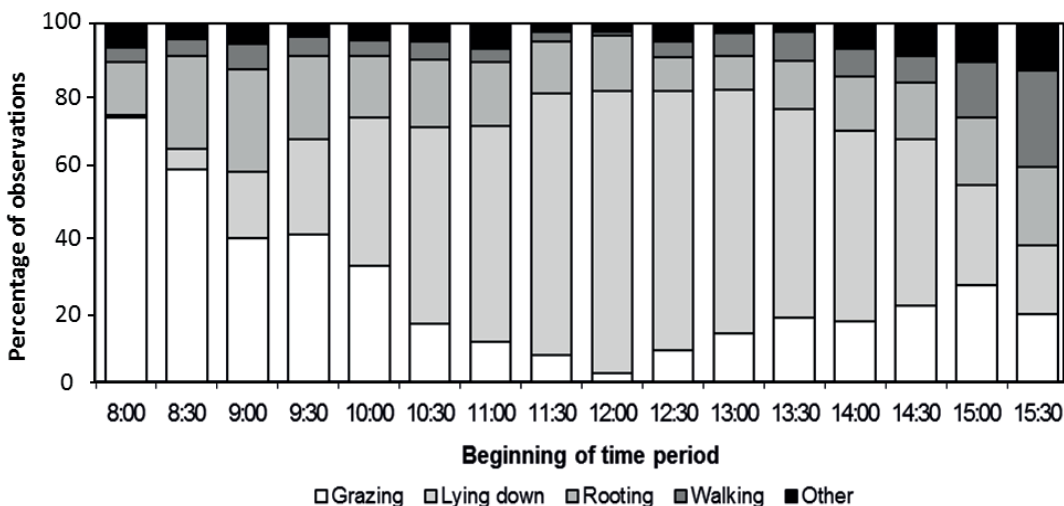


Figure 2. Percentage of wild boar observed to be engaged in the different activities during each 30 minute period of an 8-hour long grazing session (n=35). “Other” activities include playing and drinking.

grazed in Horrell *et al.* (2001), in which between 22% (sows with rigid nose-rings) and 27% (non-nose-ringed sows) of animals were grazing during 3.5 hour observation periods. In another study, pigs in their natural environment were reported to spend 20-30% of their time foraging (Stolba and Woodgush, 1989), similar to the results from the present study. This similarity is interesting because the animals in this study received free access to a concentrated diet following the grazing period, so it could have been expected that they would spend less time foraging during the day when compared to wild individuals.

Despite the fact that the animals had nose-rings, they still spent a significant amount of time rooting (slightly over one hour and 20 minutes during the eight hours), although the observations in the present study did not differentiate between rooting with the snout and with the hoof, as this was not an objective of the work. However, no damage (such as holes in the pasture cover) was observed. In all of the observations, the animals were doing one of the identified activities (grazing, rooting, walking, running, playing, lying down or drinking). There were no observations of “other activities”; for example, no animals were observed to be standing motionless, despite the report in Horrell *et al.* (2001) that adult nose-ringed sows spend a significant proportion of their time standing motionless with no functional activity.

There was a notable pattern to the behavior of the animals throughout the day. The animals mostly grazed when they first entered the paddock, with the majority of animals grazing. During the first 2.5 hours in the paddock, the animals spent 49% of their time grazing. This high level of grazing was to be expected, as they had no access to food after receiving the concentrated diet at the end of the previous day. The proportion of animals grazing then gradually decreased, most likely as the animals became satiated. After the first 2.5 hours, 14% of the animals were grazing. Rooting was another notable activity during the early part of the day. The proportion of observations

of rooting was slightly higher near the beginning of the day, but there were always animals that were observed rooting throughout the day. The proportion of animals that were observed lying down (presumably resting) gradually increased through the morning, reaching a maximum from 11:30-13:00, when 73-78% of animals were lying down. In the early afternoon, the proportion of animals lying down gradually decreased, with the boars slowly becoming more active. During the day, the cycle of grazing had two peaks, at the beginning of the grazing period and the early afternoon.

Factors that could be expected to influence the amount of pasture consumed by grazing animals and thus the amount of time spent grazing include ambient temperature and pasture quality. In the present study, there was no significant effect of daily air temperature on the amount of time that animals spent grazing. This result is consistent with Hodgkinson *et al.* (2009), where the effect of average daily air temperature on the amount of pasture DM consumed by European wild boar was evaluated, and no significant correlation was found between air temperature and DM consumption through grazing within the temperature range of 9.4 to 20.7 °C. The average daily temperatures in the present study were within this temperature range.

Examining the effect of pasture quality on grazing behavior was not an objective of the present study. However, it is interesting to note that in a study by Hodgkinson *et al.* (2009) in which pasture DM consumption of European wild boar was measured when the animals were in paddocks with different botanical compositions (a paddock containing predominantly *L. perenne*, a grass species, versus a paddock containing predominantly *Plantago lanceolata*, a broadleaf species), there was no difference in the DM intake of the animal between the two paddocks. Thus, it is unclear if there is an effect of pasture quality on pasture consumption.

The results of this study suggest that producers who are worried about the effect that treading of

the animals may have on their paddocks can allow wild boar to graze a paddock with good quality grass for a shorter period in the morning (for example, 2.5 h) and then move them to another paddock with lower quality grass (a sacrificial paddock). However, the DM intake of these animals is likely to be somewhat lower.

was high when they first entered the paddock, decreased over the following hours, and then began to increase slightly again toward the end of the 8 hour period.

Acknowledgement

Over an 8 hour period with access to pasture, European wild boar spent a significant amount of time grazing (26%). The grazing intensity

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Resumen

S.M. Hodgkinson, F. Matus y I.F. Lopez. 2013. Comportamiento del jabalí silvestre europeo (*Sus scrofa*), en pastoreo, en un sistema semi-extensivo de producción. Cien. Inv. Agr. 40(1):193-199. El comportamiento de los jabalíes en pastoreo no ha sido investigado en los sistemas semi-extensivos de producción que se utilizan para producir jabalíes en países como Chile. Es importante tener información al respecto para manejar estos sistemas adecuadamente. El objetivo del estudio fue determinar la proporción del tiempo que el jabalí en pastoreo dedica a las diferentes actividades y la distribución de las actividades durante el día. Se realizó el estudio en potreros con *Cynodon dactylon*, *Lolium perenne* y *Poa pratensis*. Un total de 35 jabalíes puros con peso vivo de 37,4 + 1,11 kg (promedio + error estándar) con anillos nasales fueron utilizados en el estudio. Los animales estaban en el potrero desde las 08:30 h hasta las 16:30 h, después de lo cual tenían acceso a una dieta comercial por una hora y fueron ubicados en corrales en una sala con ambiente controlado hasta el día siguiente. Se registró la actividad de cada animal cada 5 minutos durante su tiempo en el potrero, categorizando las actividades como: pastorear, escarbar (con hocico o pata), caminar, correr, jugar, estar echado, tomando agua u otra actividad. Los animales dedicaron 26% del tiempo a pastorear, 17% escarbar, 7% caminar, 3% jugar y 44% estar echado. Al entrar al potrero, pastorearon en forma intensiva (74% de las observaciones) durante la primera media hora. La actividad de pastorear decreció gradualmente, alcanzando su punto mínimo entre las 12:00 h y las 12:30 h, con solamente un animal pastoreando. El número de animales observados echados aumentó gradualmente a través de la mañana. Durante la tarde, la proporción de animales pastoreando aumentó gradualmente, alcanzando un máximo de 27% de los animales pastoreando a las 15:00 h. Durante 8 horas con acceso a pradera, el jabalí pastorea por un tiempo significativo (26%). La intensidad de pastoreo fue alta cuando ingresaron al potrero, bajo gradualmente durante las siguientes cuatro horas y aumentando nuevamente hacia el final de las ocho horas.

Palabras clave: observación del comportamiento, patrones de comportamiento, jabalí europeo, pastoreo.

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