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POSTER

Feeding behaviour of Cinta Senese and Large White x Cinta Senese pig at pasture

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Additional keywords

Grazing.
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SUMMARY

The valorisation of natural pastures through grazing may represent an additional value in livestock farming both in terms of economic value and of product quality. Nevertheless, understanding foraging strategies is crucial for an efficient use of natural resources. This study aimed to compare the feeding behaviour of two pig genetic types: the native pure-breed Cinta Senese and its crossbreed with Large White. The pigs had available herbaceous pasture, however supplemental feed was distributed. Direct observations were conducted on two herds of grazing pigs during the pasture season from May to September, when natural feeding resources are mostly available. In the trial days, animals were observed by scan sampling every 15 minutes during the daylight hours. The results of ANOVA revealed that during the middle hours of the day both genetic types appeared less involved in active behaviours (feeding and moving), displaying greater propensity to resting activities (e.g. lying and standing). In particular, movement recurred more frequently during the morning hours in both genetic types. Cinta Senese pigs spend more time in foraging activity, especially in rooting, during the morning than in middle hours of the day, compared to Large White x Cinta Senese pigs. These results confirm the pronounced aptitude of this local breed to the research of natural food.

Comportamento alimentare di suini Cinta Senese e Large White x Cinta Senese al pascolo

Parole chiave aggiuntive

Pascolamento.
Comportamento dei suini.
Razza autoctona.

SOMMARIO

La valorizzazione dei pascoli naturali attraverso il pascolamento può rappresentare un valore aggiunto negli allevamenti zootecnici sia in termini economici sia relativamente alla qualità dei prodotti che ne derivano. Tuttavia, la conoscenza e la comprensione delle strategie di pascolamento sono fondamentali per un uso efficiente delle risorse naturali. Questo studio ha lo scopo di confrontare il comportamento alimentare di suini di due tipi genetici: la razza autoctona Cinta Senese e il suo incrocio con la Large White. I suini avevano a disposizione pascoli erbacei, tuttavia veniva distribuita un'integrazione di mangime. Osservazioni dirette sono state condotte sul comportamento di due gruppi di suini al pascolo durante il periodo compreso tra maggio e settembre, quando le risorse pascolive naturali sono maggiormente disponibili. Gli animali sono stati osservati attraverso la metodologia "scan sampling" ogni 15 minuti durante le ore diurne. I risultati dell'elaborazione statistica (ANOVA) hanno rivelato che durante le ore centrali della giornata entrambi i tipi genetici erano meno coinvolti in comportamenti attivi (alimentazione e movimento), mostrando maggiore propensione alle attività di riposo (posizione sdraiato e stazione). In particolare, il movimento ricorreva più frequentemente durante le ore del mattino in entrambi i tipi genetici. Il gruppo Cinta Senese trascorreva più tempo in attività di pascolamento, soprattutto nel grufolamento, durante la mattina rispetto alle ore centrali del giorno, rispetto ai suini Large White x Cinta Senese. Questi risultati confermano la spiccata attitudine della razza locale per la ricerca di alimenti naturali.

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INTRODUCTION

Rearing of local breeds fed by natural resources enables to preserve particular plants, animal agro-systems (Tirapicos Nunes 2007), and contributes to economics and social viability of marginal areas (Rachuonyo et al. 2005). Cinta Senese is an autochthonous and rustic pig breed linked with the agro-forestry area of Tuscany region in Italy and, in the last years, it has been spread the practice of crossbreeding with Large White x Cinta Senese in order to improve its productive performance (Franci et al. 2003). The rearing system of Cinta Senese and its crossbreed is usually outdoors on agricultural land and/or in forest with different levels of extensivation and animal loading (Crovetti et al. 2012). This rearing system is closely linked with qualitative characteristics of products, animal welfare (Hermansen et al. 2004) and can decrease the feed costs for farmers (Quintern et al. 2006). Pigs have retained high capacity of adapting to various dietary resources (Andersen, 2000) and many behaviour patterns related to natural foraging interest, in particular the explorative feeding behaviour based on grazing and rooting (Ferrante 2012). Nevertheless, the swine outdoor farming based on the use of grazing system can produce risks for the ecosystem conservation and understanding foraging strategies is crucial for an efficient use of natural resources Rodríguez-Estévez *et al.* (2009).

This study aimed to compare the feeding behaviour of two genetic types: the native pure-breed Cinta Senese and its crossbreed with Large White during different months and diurnal times.

MATERIAL AND METHODS

The study has been carried out in a semi-extensive rearing system. Twenty-four castrated male growing pigs (12 Cinta Senese and 12 Large White x Cinta Senese) were selected. Pigs were allocated in two separate fences with access to natural pastures (each of 3 hectares) represented by a high percentage of Graminaceae. Productivity of the pasture, measured by cutting green matter inside 8 exclusion cages (1 x 2 m), was 23.02 q/ha of dry matter, on average.

At the beginning of the trial, animals were 6 months old with an average weight of 50 kg; they reached 100 kg at the end of the observation period. Pigs received also a feed supplementation of 1.4 kg/d/head, on average, containing corn, barley, oats, field beans and sunflowers meal.

Samples of herbage and feed integration were periodically collected and the chemical analysis (dry matter, ash, crude fibre, crude protein, crude fat and fiber fractions) was carried out according AOAC (2000) and Van Soest (1990) methods **(Table I)**. Animals behaviour was registered by a team of two observers, previously trained for notice observation under field conditions without interfering with the spontaneous activities of animals. A procedure of familiarization was used in order to accustom the animals to having an observer near to them. Every observer used a chronometer to register intervals and time activity, starting and final hour. In the trial days, animals were observed by scan sampling (Altmann 1974) where all the subjects of a group are observed every 15 minutes. The observations were carried out from May to September during daylight time divided in morning, middle day and afternoon.

The different types of behaviour are reported in **Table II** and were grouped into main and specific activities related to movement, feeding and others. The relative frequencies of the main activities were subjected to ANOVA with the GLM procedure of SAS (SAS, 2004) using month, day time and breed as fixed effects.

RESULTS AND DISCUSSION

In May, pigs spent more time in feeding respect to June and August **(Table III)** probably due to higher availability of natural resources and more suitable temperature condition (19°C vs 23-35°C). In June and in August pigs were less active because the mean temperatures were out of the thermo neutral zone, as suggested by Nyachoti et al. (2004). In contrast in September, with the vegetative regrowth and the decrease of temperature, pigs increased their movement and seemed more attracted by feed. According Edwards (2003), it appears that activity level and movement are associated with the availability of feed resources in the environment.

Both genetic types showed more movement and greater interest on food in the morning **(Table IV)**. Moreover, in the morning pigs dedicated more time to rooting with significant differences respect to after-

Table I. Chemical composition of pasture and supplemental feed (% on dry matter) (Composizione chimica del pascolo e del mangime - % sulla sostanza secca).

Parameter*	Pasture n=24	Supplemental feed n=5
Dry matter	45.57	90.14
Crude protein	6.72	12.71
Ash	9.06	3.87
Ether extract	1.95	4.68
Crude fibre	30.27	10.60
Acid detergent fiber	38.88	13.83
Neutral detergent fiber	58.61	24.67
Lignin	5.37	2.82

Table II. Main and specific behaviours observed (Comportamenti principali e specifici osservati)

Main activity	Specific activity
Resting	Standing, sitting or sleeping
Moving	Walking and moving
Total feeding	Rooting or trying to root
	Grass feeding
	Supplement feeding
Other activities	Playing, watering, voice calls, baths

Table III. Pig behaviour as affected by month (Comportamento dei suini in funzione del mese).

Activity	May	June	August	September
Moving (%)	4.9^{b}	5.0^{b}	7.6^{b}	14.6^{a}
Resting (%)	36.1^{b}	58.5^{a}	60.9^{a}	33.9^{b}
Total feeding TF (%)	53.8^{a}	34.1^{b}	25.8^{b}	48.3^{a}
- Grass Feeding (% TF)	85.3^{a}	61.1^{b}	60.1^{b}	66.1^{b}
- Rooting (% TF)	4.4^{b}	7.1^{b}	23.4^{a}	19.0^{a}
- Supplement feeding (% TF)	10.3^{b}	31.8^{a}	16.5^{b}	14.9^{b}

TF: total feeding.
In row, means with different letters are significantly different (P<0.05).

Table IV. Pig behaviour as affected by day time and breed (Comportamento dei suini in funzione del periodo del giorno e della razza).

Activity	Day time			Breed		RSD**
	Morning	Middle	Afternoon	CS	CS x LW	
Moving (%)	14.2[a]	3.98[b]	5.8[b]	8.1	7.94	15.7
Resting (%)	27.4[a]	68.6[b]	46.0[c]	48.2	46.4	37.6
Total feeding TF (%)	56.0[a]	21.7[b]	43.9[c]	40.3	40.7	34.5
Grass Feeding (%TF)	60.6[a]	52.5[a]	91.1[b]	64.1	72.1	32.7
Rooting (%TF)	21.7[a]	13.5[b]	5.3[b]	17.5[a]	9.5[b]	22.2
Supplement feeding (% TF)	17.6[b]	34.0[a]	3.4[b]	18.4	18.0	31.6

CS: Cinta Senese pigs; LW x CS: Cinta Senese x Large White; RSD: Residual Standard Deviation; TF: total feeding. Within criterion, means with different letters are significantly different ($p<0.05$)

noon, when pigs spent almost all the time to feeding grass. Olczak et al. (2015) in a recent review suggest that low temperature and high humidity increased the interest in rooting activity of pigs. This condition in our study corresponds with the morning hours.

During the middle day greater propensity to resting was shown and pigs also appeared less involved in active behaviours (feeding and moving), according with Graves (1984) and Jakobsen (2014) that observed the preferences to be active during the morning and the afternoon in summer season.

Differences in feeding interest between Cinta Senese and Large White x Cinta Senese are also reported table IV, without statistical difference in total feeding and grass pasture. The interest in feeding is the same in the two genotypes, even if the crossbreed seems prone to eat more grass. On the contrary, Cinta Senese spend more time in rooting activity showing greater aptitude in food researching and confirming the pronounced aptitude of this local breed to research natural food resources.

CONCLUSION

The behaviour observations show that all activities are influenced by month and day slot, confirming the strong environment effect on animal behaviour in extensive systems, in which pigs had the opportunity to express specific behaviours and food-related activities such as rooting, which is not possible in intensive farming. Though the study on effects of genotype is not conclusive, Cinta Senese breed showed more pronounced aptitude to research spontaneous food resources.

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