THE RELEVANCE OF NATURAL BEHAVIOUR FOR PODOLIAN CATTLE

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Background

In western countries farming has been conducted until about 1950 with traditional rearing systems based on labour, to perform routine operations, and outdoor environments (e.g. pasture), to raise animals (Fraser, 2001). Subsequently, loss of land, diminution of agricultural labour and rapid development of technological systems determined animal agriculture to become subject to industrialisation, which involved the use of confinement in indoor specialised environments and the adoption of intensive production methods based on hardware and automation (Rollin, 2001). The industrialisation of animal farming induced a significant increase of productivity and a dramatic change of traditional farming practices, which, in turn, imposed an estrangement from previous semi-natural rearing conditions. The possibility to express the proper own natural behaviour is considered to be essential to animal welfare (Kiley- Worthington, 1989). Animal welfare is becoming increasingly recognised as an important component of the quality assurance for consumers of primary products of animal origin. Consumers from western countries are being influenced by ethical concerns, rather than cost, and are now moving to take a "conception to consumption" interest in farming and the associated animal welfare standards. Podolian is a local breed which has been raised with extensive systems for centuries. The current mixed system with competing industrialised and traditional systems is threatening the latter, as demonstrated by the decreasing trend observed for the number of heads of Podolian cattle (-50% in 10 years; AIA, 1999). Perceptions of Podolian cattle welfare and related traditional husbandry practices still in use thus may play an important role in favourably positioning products in premium-priced markets.

Objectives

It is important to be able to sustain, both scientifically and ethically, the Podolian farming system in relation to natural behaviour and animal welfare. This is especially relevant where current husbandry practices for Podolian cattle differ or even conflict with the practices used in intensive farming. In a market-responsive economy, these consumer preference trends highlight the need to present Podolian cattle as grown in a welfare conscious, environmentally sensitive, sustainable manner. The present study was undertaken to evaluate the possibility to promote the development of the Podolian beef meat market in relation to the farming conditions and welfare of animals.

Methods

In 2000 fifty farms of the province of Potenza (Southern Italy) were selected from the recordings of the provincial breeder association (APA di Potenza, via dell'Edilizia, 85100, Potenza, Italy). The sample was representative of the province according to number of heads and location. A trained interviewer visited the farms and filled in a questionnaire which included 4 cards, each one corresponding to 1 animal category: calves (from birth to weaning), replacements (from weaning to first calving or first mating), feeders (from weaning to slaughter), adults (from first calving or first mating to culling). A preliminary card concerning general information on the farm (location, owned surface, conduction, etc.) was also included.

Results and discussion

Main traits of the farming systems used for calves and cows are depicted in table 1. Cows were usually not nursed at calving (30% nursed vs. 70% not nursed). After parturition calves were left with their mothers (97%) for 9.1 $\pm$ 2.9 months either at pasture (41%) or in provisional sheds (12.2%) or in loose barns (46.3%). Webster (1994) observed that under natural conditions dams begin to leave their calves in group at about two weeks of age while they graze nearby. Cow-calf pairs remain together until the calf is gradually weaned at approximately 6-8 months (Philips, 1993). Therefore, Podolian calves were dam-reared until the age of natural weaning. According to Le Neidre (1993), for calves the main welfare problems associated to intensive farming are: isolation from mothers, isolation from other consepecifics, reduced space allowance, barren environment, diet based on reconstituted milk. Unlike in most intensive cattle farming system where artificial rearing is performed, in the Podolian farming system calves were not separated from the cows, thus they could benefit from maternal milk and undergo a balanced and gradual growth. Artificial reared animals may display abnormal behaviours, such as a persistent tendency to spend a considerable amount of time sucking either the navel or the scrotum, or the prepuce or the teats of other pen mates with evident sanitary problems. More importantly, calves were not isolated from their dams and other conspecifics of the same age which represent their principal social models, thus allowing a normal development of their natural behaviour due to the availability of a number of diverse stimuli of maternal, social and environmental origin (Le Neidre, 1993). All calves had outdoor space availability, therefore their cleanliness was high (68%) and disease incidence (e.g. diarrhoea) low (44%) or none (46%). A high cost of calf rearing at pasture was represented by a high percentage (9%) of young animals killed by prayers (wolves and ferelized dogs). Therefore, in this farming system natural selection affects survival of individual animals more than human selection thus allowing anti-predatory behaviours to be preserved into the population (Koene and Greumen, 2000). Fifty percent of the calves were not finished and slaughtered after separation from mothers at about 10 months of age. Remaining animals were finished either in tie stalls (10%) or in strewed loose barns without outdoor paddock (30%) or on pasture (20%) where they all received mixed hay and concentrate. These finishing animals were slaughtered at 18 months of age.

Conversely, most of replacers were kept on pasture (61%) as compared with tie stalls (0%), pasture with nocturnal shelter (19%) and strawed loose barns with outdoor paddock (10%). Only this latter group received mixed hay and concentrate, whereas the others fed directly on pasture. Free ranging herbivores have the opportunity to taste a heterogeneous assemblage of different foods. Choices are much more limited in confinement: animals can only select among plant parts (leaves, stems, cobs, kernels, etc.) and few plants species included in the ration. In addition, when feeds are chopped and mixed, as in unifeed rations of most intensive cattle farms, diet components become increasingly difficult for animals to be separated. Grazing on natural pasture allows selection among a diverse array of herbaceous and arboreal plants based on nutrient requirements and individual preferences as influenced by physical characteristics, accessibility and palatability (Provenza *et al.*, 1998). Therefore, also for feeding and similarly to wild herbivores, Podolian cattle could express their natural behaviour and select a balanced diet in response to their changing needs and physiological status.

Artificial insemination was occasionally used and only in 9% of farms. Therefore, animals were allowed to express their proper mating behaviour through the progressive development of typical precoital activities involved in courtship behaviour (greeting, interchange of sexual stimuli, oestrus display) and female reception of male. Bulls displaying their natural reproductive behaviour spend more time in courtship than mounting activities, the most frequent behavioural categories being licking and sniffing the genital area, to determine if the cows are in

oestrus and, therefore, receptive (Chenoweth, 1983). In addition, more attempts to mount than effective mounts are performed (Molina *et al.*, 2000). Such behaviours are systematically suppressed when artificial service is used. If at least one male is reared within the herd further beneficial effects can be observed: the onset of puberty is accelerated (Roberson *et al.*, 1991), post-partum reproductive activity is stimulated (Cupp *et al.*, 1993) and pregnancy rate is increased (Rodriguez and Riviera, 1999). The exact nature of the cues transmitted from the bull and perceived by the cow during male-female interaction is not known, but those that are likely to play a role include olfactory, visual and auditory stimuli (Zalesky *et al.*, 1984).

In 59% of farm, where milk is usually harvested, a peculiar and traditional milking method is used: only two teats are used for milk production, whereas two others are left to the calf which is allowed to suckle while the mother is hand-milked. Although Podolian cattle are considered semi-wild animals, stockmen do not usually have problems in performing this practice, even if it is rather complex: each subject has to be isolated from the herd, her own calf allowed in close contact and hind legs tied up before hand milking can start. In addition, stockpersons were able to distinguish animals individually in 98% of farms, thus more attention could be pied to single subjects. Conversely, in intensive farming decisions are made taking into account herd efficiency rather than individual animal health and welfare.

Calf suckling, hand-milking, body cleanliness and a low mean milk production (5 kg/d, 4.4% fat, 3.5% protein, 4.5% lactose, 4 month lactation) determined the absence of mastitis in the 80% of farms, whereas it was only occasional (less than 5% of cows per year) in the remaining 20%.

It is difficult to determine how, if at all, cleanliness is related to the welfare of the animals. However, given a chance, animals choose to keep their bodies free from dung. In our study, free-ranging animals showed high levels of cleanliness, particularly in dry seasons (spring and summer), when 60% of farms had animals very clean.

Modern feeding based on high protein and energy concentrates and genetic selection for yield is having unfavourable effects on most health and fertility traits of dairy cows. As a consequence, many animals are worn out producing milk by the time they reach 5 or 6 years of age (2-3 lactation). These animals are then slaughtered, whereas the natural life span of a cow is around 20 years. The longevity of Podolian cattle was 14 years. However this datum has been recorded in 2000 and, therefore, it has been affected by the E.U. regulation No 2777/2000 on exceptional support measures for the beef market. Previous data, as indicated by stockpersons, reported animals living up to 18-20 years.

Based on the present results it can be concluded that current Podolian farming system allow animals to express their own natural ethogram. These high standards of welfare-friendly rearing and management systems may thus promote the positioning of products obtained from Podolian cattle in high price markets and help preserving this breed and the related traditional rearing system.

Pertinent literature

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Table 1. Main traits of the Podolian farming system (mean ± σ).

Calves	
Age of separation from mothers, months	9.1 ± 2.9
Losses for predation, %	9.0 ± 4.0
Slaughter age, months	16.2 ± 3.0
Adults	
Heads, n	65 ± 59
Age at first calving, months	33 ± 5.0
Calving interval, months	14 ± 2.0
Age at culling, years	14 ± 1.8