

In Disturbed Behaviour in Farm Animals, ed. W. Bessel,
Hohenheimer Arbeiten, 121, 42-50. Stuttgart: Eugen
Ulmer, (1982).

HUSBANDRY METHODS LEADING TO INADEQUATE SOCIAL
AND MATERIAL BEHAVIOUR IN CATTLE

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ABSTRACT

Calves which would normally suckle from their mothers' teats are often deprived of much opportunity to do so and problems may arise because they suck objects in their pens, their own hair, or parts of other calves. Pen-sucking and hair-balls in the gut are most frequent if the calves are spatially and visually isolated. Such calves do not learn to behave advantageously during social interactions and may suffer considerable disadvantage in a competitive feeding situation. Excessive handling of some calves by farm staff may also lead to abnormalities of social behaviour.

Early calving and the crossing of large bulls with small cows may lead to calving difficulties. Long-term selection of dairy cows for milk production has led to cows having pendulous udders and large teats. Calves of older cows often fail to find the teats and suckle; hence they obtain no colostrum. A few heifers prevent their calves from suckling, especially if they themselves have been isolation-reared. Group-calving can lead to calf-stealing and impaired calf survival. Other aspects of husbandry can lead to high levels of fighting, lack of social recognition, abnormal reproductive behaviour, or management difficulties.

In this paper I shall discuss some animal husbandry methods used during calf-rearing and during adulthood which may result in the animals showing inadequate social responses. These inadequacies may be indicative of a welfare problem, or may be associated with inefficient animal production, or frequently, may be related to both welfare and production problems. Experiments by myself and by my colleagues Drs Beaver, Waterhouse and Edwards were carried out on the farms of the University of Reading and the National Institute for Research in Dairying.

EFFECTS OF MATERIAL DEPRIVATION

Calves are sometimes reared by their mothers, for example in a suckler herd, but they are also reared without mothers, in groups or in isolation. If reared alone they often have little variety of sensory input, components of calves reared with the

mother or in isolation have shown a persistently lower level of activity in isolation (PYLIOUN et al, 1974; HIESE et al, 1977). Many calves have a general lack of variety in their surroundings and specific cues which would normally elicit responses e.g. the teats of the mother or the moving body of an adult or of another calf, may be absent.

New-born calves spend much of their time during periods of activity behaving in such a way that they are likely to find the mother's teats. They suck vigorously at the teat and will suck at other objects if no teat is found. In the absence of the mother, calves may start to suck parts of their pen or other calves and such behaviour may continue even until adulthood (WOOD et al, 1967). When calves suck the ears, umbilicus, or scrotal region of other calves they may cause damage with subsequent infection (KILEY-WORTHINGTON, 1977). Long periods of non-nutrient sucking may result in reduced food intake and the problem is especially serious for bull calves which suck at the penis and ingest much urine (J.H.M. METZ, pers. comm.). Injurious sucking is commoner in bucket-fed calves (CZAKO, 1967; KITTNER, 1967; WOOD et al, 1967; SCHEURMANN, 1974) but many bucket-fed calves do not show it. If the sucking persists into adulthood cows may drink their own or one another's milk and cause considerable economic losses (WOOD et al, 1967).

There have been various suggestions as to how to overcome this problem but there are as yet no clear answers. We have tried to assess the effects of giving isolated calves a non-nutritive teat for 12 weeks in their home pen (WATERHOUSE and BROOM in prep). The calves spent much time sucking this teat but neither these calves nor controls without such a teat showed non-nutritive sucking at a later age. It seems likely that the incidence of injurious sucking could be reduced by the presence of a non-nutritive teat in the first few weeks, provided that the diet was adequate and the rearing pen provided sufficient sensory stimulation.

EFFECTS OF ISOLATION-REARING

Calves reared in isolation may be visually and spatially isolated or merely separated from other calves by wooden or metal bars so that they can see and touch one another. When the behaviour of calves reared for 12 weeks in these two conditions was compared (WATERHOUSE, 1978; WATERHOUSE & BROOM in prep), the calves in extreme isolation (I) were found to stand more, look out of the pen more and spend more of the time whilst they were standing carrying out investigatory behaviour in the pen, than did the controls (C) (Table 1). The high incidence of licking themselves is in accord with the widespread finding that veal calves isolated in small bare pens lick themselves so much that large hair balls can form in the gut and sometimes block it. When put in groups of five at 12 weeks of age, the I calves were less active than C calves and showed behaviour which reduced the chances that they would interact with other calves (Table 2).

EFFECTS OF HUMAN HANDLING

Calves which seldom see people are difficult to handle so contact with stockmen is desirable. Those calves which are treated as pets by farm staff may become a nuisance in later life, however, for they may not associate with other cattle, perhaps even showing abnormal sexual behaviour, and they may approach all people closely. Calves which were regularly checked by an experimenter made contact with other calves less often than did controls during the 12 weeks in individual rearing pens and showed some signs of being less active and less competitive than controls after grouping. It seems that excessive handling of some of the young calves being reared is inadvisable.

EFFECTS OF EARLY BREEDING AND BREED CROSSES

Calving by heifers takes longer and is more likely to require human assistance than calving by older mothers (WILKINS, 1952; VAN DER MEY *et al*, 1979) (Table 4).

Calving duration (min.)	Parity			
	1	2	3	4+
76	46	54	45	
Cow's latency to stand (min.)	25	7	3	2

TABLE 4

The younger the heifer, the greater the calving problems, but there is considerable economic pressure on farmers to get heifers in calf as early as possible. Another practice which leads to difficult calvings is crossing large bulls (e.g. Herefords) with smaller cows, (e.g. Hereford x Friesian) (JON VAP, 1963). If the calving is difficult the mother may be weak and take a long time to stand. The calf may die or may be weak and have difficulty finding the mother's udder. Weak calves need to be put to the mother's teat, or bucket fed, in order that they can obtain colostrum and, in beef calves, milk.

EFFECTS OF SELECTION FOR MILK PRODUCTION

For many generations, dairy cows have been selected for their milk production rather than for their mothering ability. In spite of this fact most show adequate maternal behaviour. The main difficulty for calves which has resulted from this selection is that the udders of older mothers hang low and have teats of large diameter. Since there is a gradual decline in the calf's absorption of immunoglobulins from birth to a low level at 20 hrs (KIRSE, 1970) it is important for suckling to occur during the first few hours after birth. In a study of 161 heifers, 12% of calves failed to suckle during the first six hours after birth (EDWARDS, 1981 & *in press*). The proportion

falling to suckle was greater for cows than for heifers (Table 5) (EDWARDS & BROODY, 1979) and the major factor causing the delay before first suckling was that the calves were unable to find the teats of and suckle from mothers with large pendulous udders and long, fat teats (Table 6). This result confirms that of SELMAN *et al* (1970b).

Parity of dam	n	Median suckling latency (min)	% not suckling in 6 hours
1	62	159	20
2	38	238	26
3	20	360	55
4	38	313	45

$\chi^2 = 12.5, p < 0.01$

TABLE 5

Height of tip of teats	n	Median suckling latency (min)	% not suckling in 6 hours
5 cm above hock	24	128	17
hock level	85	209	28
5 cm below hock	38	320	45

$\chi^2 = 5.99, p < 0.05$

TABLE 6

Few cows totally reject their calves but heifers sometimes do so (SELMAN *et al*, 1970 a). EDWARDS (1981, *in press*) found that 11% of singly penned heifers did so and more heifers butted or kicked their calves (Table 7). Heifers which had themselves been reared in spatial isolation for their first eight months of life showed more avoidance behaviour towards their calves and were more likely to reject them (BROODY & LEAVELL, 1977; BROODY *in prep*). Thus it seems that prolonged early isolation-rearing may lead to heifers avoiding their calves, just as they avoid age-mates. Such behaviour is shown by only a small proportion of heifers and behaviour towards second calves seems to be more normal.

	C	I	
% time standing	27	44	p<0.002
% time with head through bars (not eating or drinking)	18	35	p<0.005
licking self as % of time standing with head in pen	8	13	p<0.05
rubbing head on pen as % of time standing	1.0	2.3	p<0.005

TABLE 1 Behaviour of 0-12 week, individually-penned, calves which have contact with neighbours (C) or which are spatially and visually isolated (I)

	C	I	
% time walking	42	29	p<0.05
% time in cubicles	32	50	p>0.05

TABLE 2 Behaviour of C and I calves when put in groups of five at 12 weeks of age

These differences in behaviour are similar to those observed in another study in which spatially isolated and group-reared calves were compared (BROOM in prep). When calves reared in groups of three and spatially isolated calves were put into a group of 12 at eight months of age, the isolated calves showed anomalous social behaviour. Detailed analysis of videotapes of the interactions between group-reared (G) and isolation reared (I) calves showed that I calves made inappropriate responses and, after being butted or pushed, avoided further encounters (Table 3).

	C	I	
Return gaze when G calf approaches	100 %	50 %	p 0.002
Ears back when G calf approaches	57 %	87 %	p 0.08
Retaliate if attacked	42 %	0 %	p 0.002

TABLE 3 Social responses of 8 month calves recently put in a group of 18 after rearing in groups of three (G) or in spatial isolation (I).

	Parity			
	1	2	3	4+
Suckling or udder-nuzzling interruption by mothers (min. $\frac{1}{2}$)	1.1	0.4	0.3	0.1
Butting calf (% of cows)	26	16	12	0
Kicking calf (% of cows)	63	37	13	24

TABLE 7

EFFECTS OF CALVING IN GROUPS

The use of individual pens for calving is desirable but not all farmers have sufficient pens, especially if they have tried to synchronise calving in the herd. When cows calve in groups, calves may be stolen from their mother by animals whose own calving is imminent and calves may approach and suckle from alien cows. This is also a severe problem at lambing (WINFIELD, 1970; WELCH & KILGOUR, 1970). In a study of a group calving situation EDWARDS (1981 & in press) found that 33 % of calves showed cross-suckling at some time during the first six hours post partum. If a cow accepts an alien calf its colostrum may be taken by that calf so that there is none left for its own calf. A calf which does not or cannot feed from its mother because of stealing may receive no colostrum at all. In this study 10 % of calves were deserted, usually because the mother stole another calf. In extreme situations the attention of herd members other than the mother may result in calves being trampled to death (KILEY-WORTHINGTON, 1977). Many calves do survive perfectly well in group calving situations, indeed those rejected by their mothers may benefit from them, but calving in individual pens would seem to be better practice if it is possible.

OTHER HUSBANDRY EFFECTS

Several other aspects of husbandry can have adverse effects on social behaviour (see other papers in this volume). High densities in yards may result in increased aggressive behaviour in some animals with consequent withdrawal and injury or impaired growth in others. Changes in social group composition also leads to increased competitive behaviour. The sizes of groups of cattle may be so large that individual recognition by group members is not possible (ALBRIGHT, 1978) and this may impair production. Hormonal treatment may lead to aberrant sexual behaviour. Rough or unpredictable treatment by stockmen may result in management difficulties, excessive defaecation in milking parlours and reduction in milk yields or other production measures. In order to manage cattle well it is important to understand their needs and the functioning of their behavioural mechanisms.

In a rank order based on the results of competitive interactions, the I animals were at the bottom at 8 months (Fig 1) and remained there when observed again 12 months later (BROOM & LEAVER, 1978). When concentrates were available only in a competitive situation, some of the I calves failed to get any. They ate only hay and I calves showed a poorer weight gain than G calves.

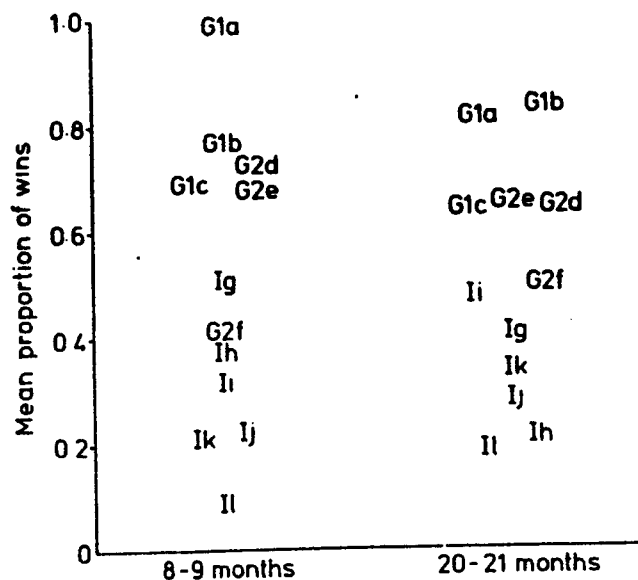


Fig 1 For each animal (a, b, c, etc.) the mean of the proportion of competitive interactions won against each other animal is plotted. The calves watched in a group at 8 to 9 months were watched again at 20 to 21 months. G1-Group 1 during rearing (0 to 8 months), G-2 Group 2, I-isolation-reared (after BROOM & LEAVER, 1978).

Since extreme isolation can lead to the harmful production of hair balls in the gut, pen chewing and inability to compete for food it would seem to be inadvisable. Visual and tactile contact during rearing reduce these effects and, if some isolation does occur, situations where the animals have to compete for food should be avoided. Long-term isolation of dairy bulls during rearing and during adulthood often results in the animals being dangerous to man and to other cattle whereas bulls kept in groups are much less aggressive (HUNTER & COUTTIE, 1969).

I thank Dr. S.A. Edwards for helpful discussion and comments on the manuscript.

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