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## BREEDING DAIRY CATTLE WITH REDUCED SUSCEPTIBILITY TO BLOAT

C. S. W. REID,\* R. T. J. CLARKE,\* M. P. GURNSEY\*,  
R. E. HUNGATE,† K. L. MACMILLAN‡

EVEN in a severe outbreak, it is unusual for all animals in a herd to bloat. In stall-feeding experiments with fresh red clover (*Trifolium pratense* L.), a wide range has been found in the susceptibility of non-lactating dairy cows to the disorder. Some animals have a high susceptibility (HS animals), while, at the other end of the range, some have a low susceptibility (LS animals) (Clarke and Reid, 1970). HS animals bloat readily and frequently, but they do not always bloat at a time when, from previous experience, conditions would be predicted to be conducive to the disorder, or even when other individuals of their kind are bloating (Johns, 1954). Conversely, LS animals bloat infrequently, if at all, and when they do, their reticulo-ruminal contents are foamy and similar in appearance to those of bloating HS animals (Reid, 1960).

Susceptibility to bloat appears to be a characteristic of the individual animal. Little work has been carried out on its heritability, although strong evidence for its being an inherited trait is given by the observations of Knapp *et al.* (1943) on bloat in beef progeny, and those of Hancock (1954) and Johns (1954) on the similarity of bloating behaviour of monozygotic twin cattle. In Table 1 are shown some results from a New Zealand survey, in which bloat susceptibility was ascertained on a simple yes/no basis. As determined by this unsophisticated criterion, the sires J3 and F had, when compared with the other sires, (a) a larger proportion of sons that apparently bred no offspring susceptible to bloat, and (b) less than 1/5th the proportion of granddaughters recorded as susceptible to bloat. The data in the table give support for the concept of breeding dairy cattle with low susceptibility and high productivity. That it is possible to reduce susceptibility and

\*Applied Biochemistry Division, DSIR, Palmerston North.

†Bacteriology Department, University of California, Davis, California, U.S.A.

‡New Zealand Dairy Board Artificial Breeding Centre, Awahuri.

TABLE 1: TRANSMISSION OF BLOAT SUSCEPTIBILITY BY FOUR AB SIRES  
Data from a New Zealand Dairy Board investigation

<i>Sires</i>		<i>Sons</i>			<i>Granddaughters</i>	
<i>Sire</i> (a)	<i>M/F Rating</i> (b)	<i>n</i>	<i>Average</i> <i>M/F Rating</i>	<i>Proportion</i> <i>not breeding</i> <i>susceptible</i> <i>cows</i>	<i>n</i>	<i>% Susceptible</i> <i>to Bloat</i>
J1	+36	6	+9	0/6	267	11
J2	+21	30	+14	3/30	1320	8.2
J3	+38	20	+31	11/20	873	1.6
F	+50	11	+40	4/11	625	1.6

(a) J — Jersey; F — Freisian.

(b) Milk fat rating.

The authors are indebted to Miss E. J. Currie for the basic data.

at the same time retain productivity seems indicated by the inverse distribution of the milk fat ratings of the sons and the susceptibility of the granddaughters.

If the factors determining susceptibility could be established, a more rational, more precise basis would be provided for a breeding project. The immediate site of action of the factors appears to be the reticulo-ruminal contents since, in stall-fed cows, total exchange of these contents between an HS and an LS animal before feeding results in a temporary exchange of susceptibilities (Clarke and Reid, 1970). Attempts to determine the factors themselves have so far failed. No consistent differences have been found between HS and LS animals for a series of parameters including salivation rate during feeding, water flows through the reticulo-rumen, the dry weight of reticulo-ruminal contents before feeding, their buffering capacity before feeding, their pH before and after feeding, microbial activity in them before, during and after feeding, and rumination behaviour. The level of feed intake has a dominating effect for many of these parameters: when it is allowed for, residual differences that might correlate with bloating characteristics have been undefinable by the methods so far used. The work is proceeding.

#### REFERENCES

- Clarke, R. T. J.; Reid, C. S. W., 1970: In *Physiology of Digestion and Metabolism in the Ruminant*, ed. A. T. Phillipson. Oriel Press, Newcastle-on-Tyne.
- Hancock, J., 1954: *J. agric. Sci. Camb.*, 45: 80.
- Johns, A. T., 1954: *N.Z. Jl Sci. Technol.*, A, 36: 289.
- Knapp, B.; Baker, A. L.; Phillips, R. W., 1943: *J. Anim. Sci.*, 2: 221.
- Reid, C. S. W., 1960: *Proc. VIII Internat. Grassld Congr.*, p. 668.