

# Evaluation of cow comfort index and stall usage index in different cooling systems for dairy cows

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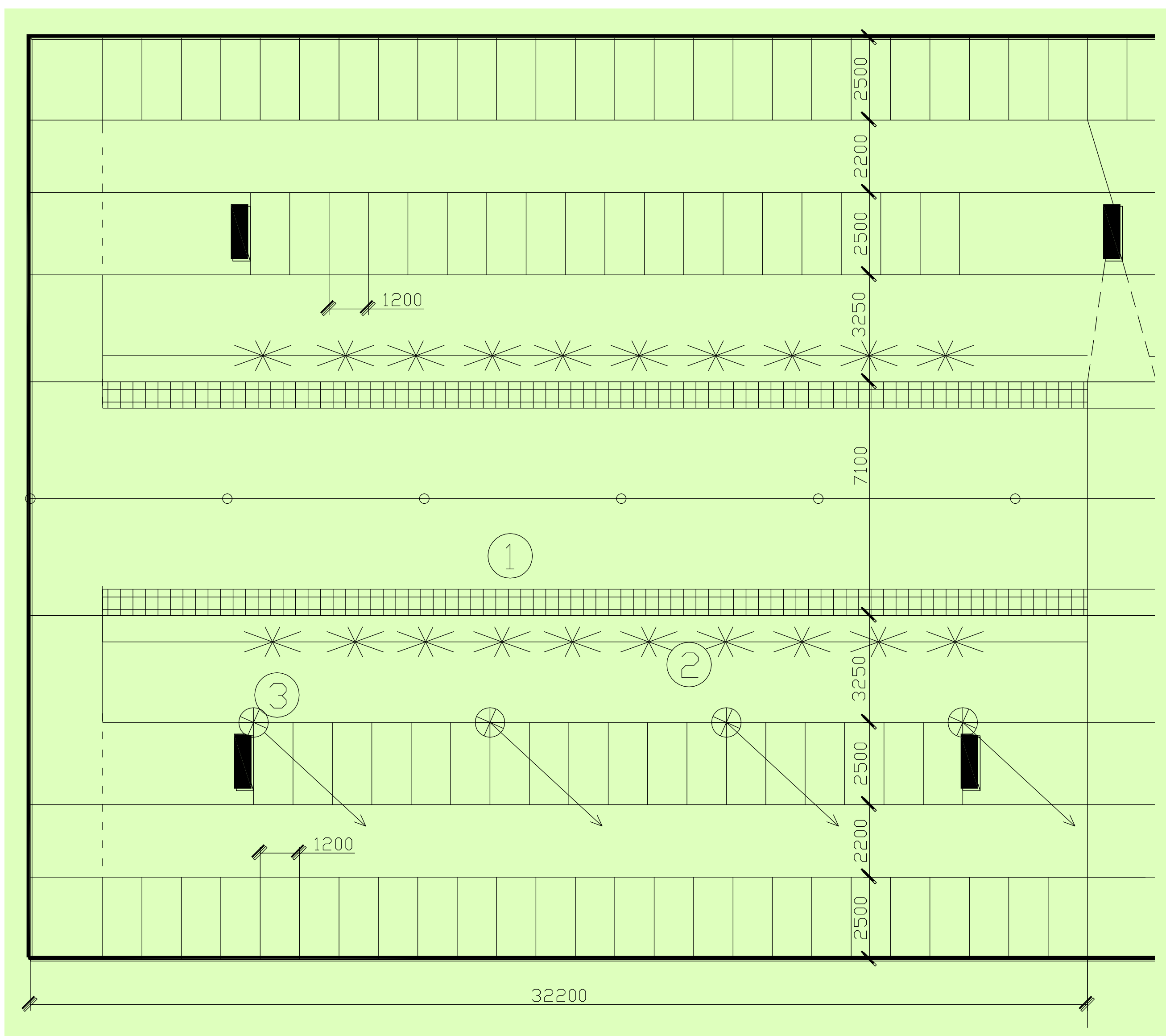


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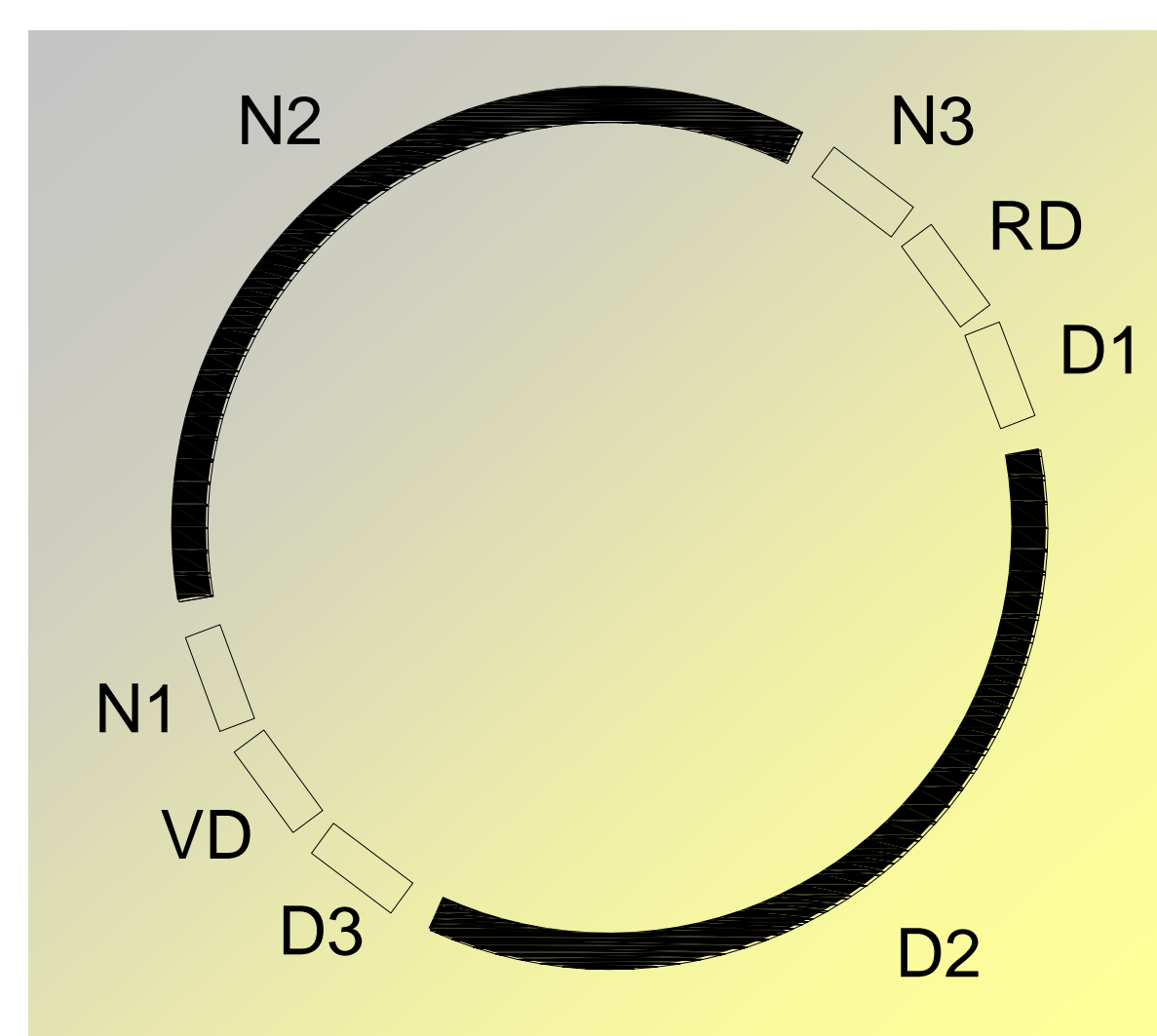


The aim of this study was to investigate the changes in cow comfort index CCI and stall usage index SUI in groups with different cooling systems. Two identical groups of Holstein dairy cattle (2x43 animals) with the same number of free stalls and the same bedding were tested by 10 minute intervals during 24 hour cycle. In first group S was used the sprinkling system, in group SV was disposable sprinkling system with diagonally rotated vents in summer time. There was found positive effect of animal enhanced cooling using sprinkling system with increased air movement by vents. It reflected in significant prolongation of whole lying time and shortening of time, when animals were standing. The CCI was higher in group SV with sprinklers and vents compared with that in group S with sprinklers but without vents (82.66% compared to 76.51%) in daily period one hour before evening milking. CCI was more than 5% higher in both groups at night period – computed one hour before morning milking, and cow comfort index was at night higher in group SV than in group S again (87.82% compared to 82.66%). It was found by monitoring of whole night period (from end of evening milking to start of morning milking) that cubicles were most used at last 5 hours before morning milking. Animals from group S without vents, which were less cooled, were significantly more lying down in alleys (2.52 h.d<sup>-1</sup>.cow<sup>-1</sup> vs. 0.56 h.d<sup>-1</sup>.cow<sup>-1</sup>, P<0.001). Total time spent by lying in stalls and in alley represented in group SV 11.31 .d<sup>-1</sup>.cow<sup>-1</sup>, and in group S 10.22 .d<sup>-1</sup>.cow<sup>-1</sup>.



**Figure 1** Layout of cow housing design

S – group with sprinklers, SV – group with sprinklers and ventilators,  
1 – feeding alley, 2 – sprinkling system, 3 – vents



**Figure 2** Time division of 24 h cycle

RD – morning milking, VD – evening milking,  
D1 – period 1 h after RD, D2 – period of calm daily regime, D3 – period 1 h before VD,  
N1 – period 1 h after VD, N2 – period of calm night regime, N3 – period 1 h before RD



**Experimental stable**

**Table 4** Values of Cow Comfort Index and Stall Use Index in % from 24 h

Group	Index	Period			
		D3	N3	2 hours before evening milking	2 hours before morning milking
S	CCI	76,51	83,47	77,75	85,37
	SUI	39,45	59,76	36,4	60,89
SV	CCI	82,66	87,82	77,95	88,32
	SUI	57,70	73,42	53,27	76,03

SV – sprinklers and ventilators, S – sprinklers,

CCI – Cow Comfort Index - defined as the proportion of cows touching a stall that are lying down (Nelson, 1996)

SUI – Stall Usage Index - defined as the proportion of cows that are in the pen, not feeding, and that are lying down in the stalls (Overton et al., 2003)

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