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UPDATE ON SUMMER MASTITIS

ELIZABETH BERRY, Axient, 1 Westmere Drive, Crewe

SUMMARY

Summer mastitis is an acute mastitis typically occurring during the summer in non lactating cattle. The incidence of summer mastitis varies between years and has been reported, in England and Wales, at 39% to 54% of herds affected with 2.1 to 4.1 cases per affected herd. The reported incidence for 1997 was 46% of herds affected, with 2.2 cases per affected herd. An updated estimate of the costs of summer mastitis in 1997 suggested a loss of £270 per case or a total cost of £6M per year in England & Wales. Risk factors for summer mastitis include a lack of dry cow therapy, exposure to flies, autumn calving and teat damage. Good attention to remedy these has contributed to a likely reduction in incidence from 10% of cows at risk to the 1997 figure.

INTRODUCTION

Summer mastitis has been reported from northern Europe, Japan, USA, Greece, Australia, Zimbabwe and Brazil. Regional variations occur in incidence and the classic area of occurrence is considered to be a sandy soil or low lying, wooded areas with poor drainage.

Summer mastitis is a clinical mastitis that occurs in non lactating cattle, generally at pasture, during the summer usually from the end of June to September although occasionally cases occur in October. The signs are characteristic and initially include lethargy and a swollen teat or quarter rapidly progressing to a hard, swollen and painful quarter with a thick yellow secretion and a typical unpleasant smell. Without rapid treatment, the infection progresses to induce an elevated temperature, septicaemia, oedema of the hind legs, accompanied by lameness and can result in abortions or perinatal mortalities, and sometimes death of the affected animal. The secretory function of the affected quarter is usually lost. The term, summer mastitis, can be extended to include a similar disease outside the above time period but does not include the peracute, systemic, non suppurative mastitis that occurs just prior to calving. Summer mastitis is also seen in beef cows, calves and bulls.

Edmonds and Welsh (1) reviewed cases in Yorkshire herds and found that nearly three quarters of cases occurred in August and approximately 15% in July and 12% in September. This is important for identifying the risk periods for implementing control measures. Generally June is also included in this control period.

There is an increased prevalence of summer mastitis with age and this continues to a maximum for the dry cow period between the fifth and sixth lactations (2). The lower incidence in older cows may be due to these animals being less susceptible to summer mastitis.

Bacteriological analysis of secretion from the affected quarter often reveals an infection involving several bacterial pathogens. Usually *Arcanobacterium pyogenes* (formerly *Corynebacterium pyogenes*) predominates. *Streptococcus dysgalactiae*, *Peptococcus indolicus* and Stuart-Schwan cocci are frequently isolated. *Streptococcus uberis*, *Staphylococcus aureus*, *Pasteurella haemolytica*,

Escherichia coli, Bacteroides melaninogenicus and *Fusobacterium necrophorum* have also been isolated. This latter group may be secondary invaders.

RISK FACTORS

There are various risk factors identified for summer mastitis in herds in the south of England (3) including

- High bulk milk cell count possibly indicating a lower standard of management
- An animal effect possibly related to a greater susceptibility for lower milk fats and lactose
- Grazing on permanent pasture, possibly related to greater numbers of flies hatching
- Trees around fields, but not hedges
- Topography, low lying and less windy areas reporting more cases
- Management factors relating to poor control and not meeting targets such as quota and milk quality levels

PREVENTIVE MEASURES

In the Farm Animal Welfare Council report on the 'Welfare of Dairy Cattle' (4), summer mastitis is highlighted as a welfare problem for both cows and heifers. Where the incidence is high, the consulting veterinary surgeon should be involved in applying a preventive programme. Effective preventive measures include

- dry cow therapy, this may also be necessary in high risk organic herds
- fly control, preferably starting before the risk periods
- pasture management, including cutting plants which can result in abrasions on teats
- avoiding high risk pastures for susceptible animals
- treating teat wounds promptly and possibly using teat sealants
- inspecting animals at least twice daily to identify cases promptly and to reduce the spread of disease
- changing calving pattern, this may be the only alternative in some organic herds or on some farms with limited possibilities for changing grazing

Generally it is assumed that the sheep head fly, *Hydrotaea irritans*, is involved in the transmission of infection. The circumstantial evidence is that

- the peak incidence of disease occurs when flies are most frequent on cattle
- *Hydrotaea irritans* is a frequent visitor to cattle, including teats, and is known to carry the bacteria associated with summer mastitis (5)
- the epidemiological spread of the disease coincides with the geographical distribution of the fly
- infections are commoner in the front quarters which flies can reach more easily
- fly control is known to reduce the incidence of summer mastitis.

However, infection can occur outside the fly season and in areas where the *Hydrotaea irritans*, or another suitable vector, does not occur and attempts to experimentally transmit the disease have only shown limited success (6,7,8).

Aehnelt (9), in Germany, recorded successful control of summer mastitis, reducing the incidence to 0.7% by spraying insecticides on cattle at 3 weekly intervals from the end of May to mid September susceptible animals, compared with the incidence of 9.4% in the control group.

In the 1950s it was shown that antibiotic infusions into the dry mammary gland could protect against summer mastitis. Pearson (10,11) used single and multiple infusions of penicillin in an oily base and reduced the incidence to 0.7% in treated cattle compared to 10.6% in untreated controls. However, inoculating the teats of frisky young heifers at any time is no easy task. Weigt and others (12) in Germany described an infusion method for heifers restraining the heifers in a crush and holding the nozzle over the teat orifice whilst depressing the plunger of the tube. Reasonable protection from infusing heifers has been reported (12,13). Edmonds and Welsh (1) showed a benefit from multiple infusions of an amoxycillin dry cow preparation at 3 week intervals and also had no problems with antibiotic residues even when infusion had occurred 3 days prior to calving. A cost benefit was found from use of multiple infusions compared to use of a single infusion of dry cow therapy.

ECONOMIC COSTS

In a 1992 estimate of the costs of summer mastitis (14), some 49% of losses were due to lost milk production, 37% from the lost animal value, cull and calve losses and labour, drugs and veterinary charges accounted for 14% . The average loss was £192 per case and the cost to the dairy industry in 1987 was £6.22 million. This was at a time when milk price was 16.25 p/litre and cull values were £335 to £435 depending on age. These costs would equate to a figure nearer £270 per case in 1998. Taking account of the number of animals currently in the national herd and the higher cost per case there remains a total annual cost in England and Wales of £6M.

INCIDENCE IN ENGLAND AND WALES

Since 1978 the Milk Marketing Board for England and Wales, then Genus and subsequently Axient have carried out surveys on summer mastitis experienced by users of their field service in England and Wales. Data collected included the number of cows, dry cows, pregnant heifers and non pregnant heifers and the incidence of summer mastitis. Use of dry cow therapy usage and fly control measures in place were also recorded.

Wide regional variations occurred every year, both for percentage of herds affected and the number of cases per affected herds. The south east of England generally reports a lower incidence and the north and western areas of England and Wales a higher incidence. The results over the period 1978 to 1997 are presented in Table 1.

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Table 1. Incidence of summer mastitis during the period 1978 - 1997 (including results from references 15 and 16)

	No. of herds	**No. of animals at risk**	**No. of summer mastitis cases**	**%**	**No. of herds affected**	**%**	**Average number of cases/affected herd**
1978	248	-	-		107	43	3.5
1979	393	-	-		157	40	2.4
1980	416	-	-		179	43	2.6
1981	391	-	-		231	59	4.1
1982	499	-	-		269	54	2.6
1983	484	48106	548	1.1	203	42	2.7
1984	226	26199	244	0.9	91	40	2.7
1985	275	22339	207	0.9	97	35	2.1
1986	210	22910	250	1.1	97	46	2.6
1987	182	17508	290	1.7	108	59	2.7
1988	287	27100	427	1.1	133	46	3.2
1989	317	30686	406	1.3	147	46	2.8
1990	322	26564	237	0.9	113	35	2.1
1991	350	27007	356	1.3	146	42	2.4
1992	358	27419	262	0.9	128	36	1.9
1993	360	28463	337	1.2	141	39	2.3
1997	345	24643	358	1.5	144	46	2.2

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Table 2. Summer mastitis incidence per group at risk from 1983 to 1997

Year	No. of dry cows	% affected	No. of pregnant heifers	% affected	No. of non-pregnant heifers	% affected
1983	19464	1.2	10864	1.9	17778	0.6
1984	11691	1.2	5222	1.1	9286	0.4
1985	9584	1	5379	1.5	7476	0.5
1986	11000	1.4	4563	1.6	7347	0.3
1987	8496	2.1	3383	2.2	5629	0.6
1988	12675	2.2	5573	2.3	8852	0.3
1989	13268	1.8	6437	2.2	10981	0.2
1990	13838	1.1	5055	1.2	7671	0.4
1991	12865	1.7	5379	1.7	8763	0.5
1992	12660	1.3	6357	1.4	8348	0.1
1993	13276	1.7	6706	1.5	8481	0.1
1997	9064	2.3	7264	2.0	9916	0.1

The incidence of summer mastitis in heifers and dry cows in northern Europe has been reported to be as high as 10% (17), similar to that reported from the UK and Germany for animals receiving no protection (9,10,11) In protected animals in England and Wales more than 2 % of dry cows and pregnant heifers are affected. The true incidence of summer mastitis in dry cows is probably much higher, as in most years most dry cows at risk receive dry cow therapy.

DRY COW THERAPY

In most years surveyed over 99% of herds used dry cow therapy in cows, few used dry cow therapy in heifers and few re-tubed dry cows. The herds carrying out the latter two practices tended to be herds that had experienced a high incidence in susceptible animals.

Since 1991, the percentage of herds using longer acting dry cow therapy (lasting more than 32 days) has steadily increased from 59% to 75% in 1997 (Table 3). There appears to be no difference in incidence rates for summer mastitis between those using short or long acting therapy.

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Table 3. The incidence rates for the different tubes used in the 1997 survey

Preparation	Herds using this tube		% of herds affected	Cases per affected herd using that dry cow therapy
	No.	%		
Cepravin	181	52	33	1.9
Orbenin Extra	64	19	30)	2.1)
Boviclox Extra/	4	1	60)-34	2.3)-2.0
Kloxerate Gold	10	3	50)	1.0)
Preparation lasting less than 32 days	86	25	29	2.1

Table 4. Fly control measures used from 1983 to 1997

Year	Pour on	Spray	Ear tags	Tar
1982		43	6.2	.2
1983		43	9.3	.5
1984		16	32	
1985	2	22	21	
1986	7	23	18	
1987	8	32	16	
1988	30	21	12	
1989	38	15	10	
1990	39	16	9	
1991	44	17	5	
1992	43	15	5	1
1993	47	10	4	3
1997	63	14	4	5

FLY CONTROL

Table 4 shows the changes in fly control measures from 1982 to 1997. There was a rapid uptake on the use of insecticidal pour-ons, once introduced probably due to their ease of use. Table 5 shows the fly control measures used and the numbers of herds affected and cases per herd. There were marginal differences in the incidence of summer mastitis in herds using insecticidal sprays, tags or pour-ons but

no one method seemed more effective than any other and only small numbers of herds used sprays and ear tags. Stockholm tar and insecticidal creams seem the least effective but there were only small numbers of herds using these methods.

Table 5. Fly control measures used and percentages affected for the survey 1997

Fly Control	**Herds using this method**		**Percentage of herds affected**	**No. of cases per affected herd**
	No.	**%**		
None	44	13	36	2.6
Insecticide tags	15	4	40	2.0
Insecticide sprays	49	14	41	2.0
Pour-on insecticides	218	63	48	2.4
Stockholm tar	18	5	78	3.5
Insecticide cream	2	1	100	2.0

Only 13% of herds used no fly control with 36% of this limited sample affected by summer mastitis. It may be that these herds are perceived as being of low risk. There were wide regional variations in those herds not using fly control, with the South and Mid South West, South Wales, North East, North Wales and North West Midlands and North West all having more than 10% of herds using no fly control. In the other regions fewer than 3% of herds used no fly control.

CONCLUSIONS

There was significant progress in reducing the numbers of summer mastitis cases from the levels reported in the 1950s, taking the figures given by Pearson, to the 1970s. Since then there have not been any significant or sustained changes in the incidence rates for the different groups at risk. Compared with the Scandinavian countries, there is a lower incidence of summer mastitis in pregnant heifers in England & Wales but, in some herds, attention still needs to be paid to control measures for these animals. The 1998 FAWC report highlighted summer mastitis as a welfare issue and that control measures must be used to prevent cases, especially in those herds with greater risks. Dry cow therapy and good fly control are still two of the most important and effective control measures available.

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