

Case Report: Field experience with a polyvalent mastitis vaccine on a commercial dairy farm infected with *Klebsiella*

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INTRODUCTION

Even though mastitis control programmes are frequently used in dairy production, mastitis is still one of the most frequently occurring and costly diseases on modern dairy farms (Halasa et al., 2007) The goal of this study was to evaluate the efficacy of a polyvalent vaccine on a farm with *Klebsiella* mastitis problems.

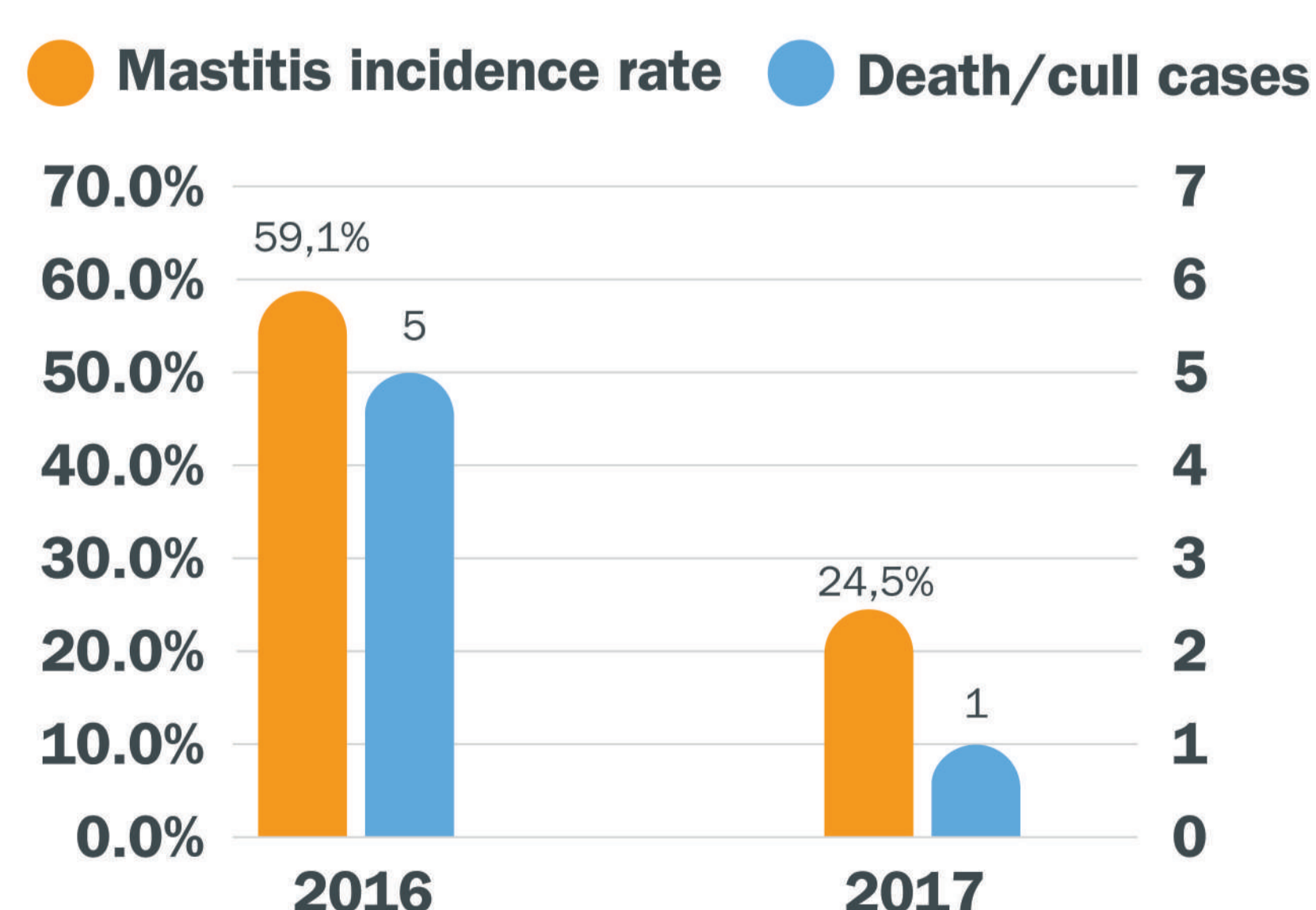
MATERIALS AND METHODS

A farm with 40 cows in free stalls, located in Hayato-cho, Kirisima-shi, Japan, with river sand bedding. *Klebsiella* had been isolated from rice husks that this farm had been using. Even though the farm had been using calcium hydroxide, *Klebsiella* mastitis had been frequently seen since 2013. For this reason, a polyvalent mastitis vaccine based on *E. coli* J5 and *S. aureus* (STARTVAC[®]) was used for the first time in October 2016 with the blanket/rolling protocol, i.e. all animals received two shots of the vaccine with an interval of 4 weeks between them, followed by vaccinations every 3 months. The heifers were vaccinated with the 1st dose 45 days before calving, with the 2nd dose 10 days before the expected parturition date (EPD), and then every three months (rolling protocol) after the 2nd dose. The observation parameters were quarterly investigation of the number of mastitis cases, deaths and culls. As a result of the efficacy of vaccination, milk production data were measured (Bradley et al., 2015). To prove the cost benefit of the vaccine on the farm, all the costs associated with treatments/vaccination were also calculated. The results were statistically analyzed by Dr. SPSSII X² test.

RESULTS

Mastitis incidence rates were 85.7% in 2014, 86.3% in 2015, 59.1% in 2016, and in 2017, 24.5%. There were 5 deaths/culls from October 2015 to September 2016 and 1 death/cull after vaccination (from October 2016 to September 2017). As a result of the decrease in total mastitis cases and the lower grade of severity of mastitis cases, daily milk production increased from the time of vaccination

Figure 1. Mastitis incidence rate and cases of death/cull from 2016 to 2017. Note that STARTVAC[®] vaccination started from 2016 October.



From October 2015 to September 2016, the average milk production per cow per day was 36.5kg, whereas from October 2016 to September 2017 the average milk production per cow per day was 37.3 kg. Therefore, 0.79 kg more were produced each day per cow after implementing vaccination. Similar results were observed in a study carried out by Bradley et al. in 2015.

Table 1. Average difference in milk production(kg) after Startvac vaccination from 2016.Oct

MONTH	2015/2016	2016/2017
10	35.7	37.3
11	35.3	36.9
12	35.5	38.4
1	35.2	36.6
2	36.3	38.5
3	35.9	38.2
4	37.1	39.0
5	36.1	38.9
6	37.1	38.7
7	38.5	36.0
8	37.4	35.3
9	38.0	33.8
Average milk production (kg)	36.5	37.3
Difference in kg		0.79

Regarding the cost benefit of vaccination, the cost of mastitis treatment was 416,280 yen in 2013, 837,700 yen in 2014, 846,020 yen in 2015, 551,820 yen in 2016 and 229,340 yen in 2017. The vaccination cost was 120,000 yen in 2016 and an estimated 301,500 yen in 2017. Therefore, the total cost of treatments and vaccination is lower than treatments alone.

Table 2. STARTVAC[®] Vaccine Return On Investment

	Nº of mastitis cases	Treatment cost	Vaccination cost	Total cost
2013	18	¥416,280	-	¥416,280
2014	42	¥837,700	-	¥837,700
2015	44	¥846,020	-	¥846,020
2016	25	¥551,820	¥120,000*	¥671,820
2017	12	¥229,340	¥301,500**	¥530,840

* Vaccination started in Oct 2016 (2 vaccination for 2016)

** Rolling protocol with 4 vaccinations plus 2 vaccinations for heifers

CONCLUSIONS

Together with other management practices to control *Klebsiella* mastitis, vaccination with a polyvalent mastitis vaccine based on *E. coli* J5 and *S. aureus* (STARTVAC[®]) resulted in fewer deaths/culls, fewer severe mastitis cases and increased daily milk production. Thus, vaccinating with a rolling protocol (vaccinating the whole herd every 3 months) on farms suffering problems due to environmental mastitis has been proved to be efficacious and profitable.