

**Effect of parity on culling and fertility in dairy cattle in Japan: the Hamanaka study**

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A present study was conducted in order to assess the actual status of effect of parity on culling and fertility in dairy cattle of grassland farming in northern Japan using event-time analysis. Dairy herd improvement data, clinical records and farm management data were collected from 2002 to 2010 in 170 herds in a region. The overall median of cow number, calving interval and days open were 61, 432 days and 159 days, respectively. Ratios of tie-stall feeding system and grazing system were 79 and 76%, respectively. Multivariable analysis was selected to moderate conditions depending on area, farm, herd, and/or cattle. The proportional hazards model with some confounder and moderator variables was used to analyze the effect of parity. Start time was calving, time events were set culling or insemination with the pregnancy (IWP) and follow-up time was 200 days after calving for clarifying involuntary events. Total 17 confounder or moderator variables were prepared for the analysis, which were the number of cows, production level, the state of farm management, year and season of calving and so on. The data of total 60,782 cows were extracted. Parity were divided into 5 groups, parity 1, 2, 3, 4 and more than 4 (>4). The adjusted hazard ratios (AHR) for culling of parity 2, 3, 4 and >4 compared with parity 1 were 1.17 (95% CI: 1.06-1.28), 1.82 (1.66-1.99), 2.46 (2.25-2.69) and 3.96 (3.66-4.28), respectively. The AHR for IWP of parity 2, 3, 4 and >4 compared with parity 1 were 0.91 (0.89-0.94), 0.85 (0.83-0.88), 0.79 (0.76-0.82) and 0.77 (0.75-0.80), respectively. These results show the increase in parity of dairy cattle in this region becomes high the risk of involuntary culling and loss of fertility. We propose that veterinarians should advise dairy farmers about herd health and production management with consideration for the parity status of the herd.