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Timing of parturition in dairy cattle

Abstract

A recent survey of calvings of dairy heifers and cows revealed that fall calvings occurred in a nonrandom pattern. The survey was conducted in a large 5,000-cow herd in which pregnant females were watched 24 hr/day. Fewer ($P < .005$) calves (42%) were born during the night-time hours of darkness (6 p.m. to 6 a.m.) than during daylight hours (58%). The time of day when calving occurred was unrelated to the duration of pregnancy or to any of the climatic variables measured, including daily temperatures (highs or lows), barometric pressure, relative humidity, precipitation, average wind velocity, or percentage of sunshine. Although some reports and popular opinion have suggested that time of calving might be influenced partly by prevailing weather conditions, our data fail to support this notion. We are unable to explain the observed nonrandom pattern of calving, except that it might be influenced by other management routines on the farm.; Dairy Day, 1988, Kansas State University, Manhattan, KS, 1988;

Keywords

Kansas Agricultural Experiment Station contribution; no. 89-107-S; Dairy; Parturition; Barometric pressure; Climate

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TIMING OF PARTURITION IN DAIRY CATTLE

J.S. Stevenson

Summary

A recent survey of calvings of dairy heifers and cows revealed that fall calvings occurred in a nonrandom pattern. The survey was conducted in a large 5,000-cow herd in which pregnant females were watched 24 hr/day. Fewer ($P < .005$) calves (42%) were born during the night-time hours of darkness (6 p.m. to 6 a.m.) than during daylight hours (58%). The time of day when calving occurred was unrelated to the duration of pregnancy or to any of the climatic variables measured, including daily temperatures (highs or lows), barometric pressure, relative humidity, precipitation, average wind velocity, or percentage of sunshine. Although some reports and popular opinion have suggested that time of calving might be influenced partly by prevailing weather conditions, our data fail to support this notion. We are unable to explain the observed nonrandom pattern of calving, except that it might be influenced by other management routines on the farm.

Introduction

Calving is a critical time for the cow and her newborn calf, because death losses are greatest during or shortly after birth for both the cow and calf. This is also a time of potentially severe debilitating injury to the cow. Difficult calving or dystocia occurs in about 6 of every 100 calvings. It is significantly higher in heifers than cows and declines in severity with increasing age. The implications of difficult calving for the cow are many. It increases her risk for retained placenta, infections of the reproductive tract, poor fertility in general, milk fever, and cystic ovaries. Information regarding the expected time of calving would be a useful management tool. If assistance at calving could save more future replacement heifers and reduce the incidence of calving difficulty and trauma for the cow, then both cow and calf would be better off, and potential income of the dairy producer would be increased.

Procedures

Holstein cows ($n=579$) and heifers ($n=345$) located in a 5,000-cow herd (Tuttle, OK), which calved from September 23 through December 17, 1985, were utilized in this study. Cattle were held on Bermuda pasture dry lots with fence-line feed bunks. At least one person was available 24 hr/day to assist and care for dry cows and heifers at calving time. Clocktime was recorded when each one calved and entered in an IBM computer spread sheet, which contained breeding, calving and treatment histories of each cow or heifer. Cows were fed in the afternoon (3 to 4 p.m.) a complete diet consisting of 5 lb corn, 2 lb cottonseed hulls, 5 lb bermuda hay, 10 lb corn silage, and .25 lb meat and bone meal, in addition to having constant access to a grass hay.

Daily climatological data corresponding to the calving dates of all cattle in the study were obtained from the National Climatic Data Center in Asheville, NC. Climatic data were measured at the Will Rogers World Airport located in Oklahoma City, OK (latitude $35^{\circ} 24'$; longitude $97^{\circ} 36'$; and elevation = 1285 ft). The dairy farm was located about 20 miles southwest of the airport. Information obtained included maximal and minimal daily temperatures, precipitation (water equivalent), average daily barometric pressure, average daily wind velocity, average percentage of sunshine, and relative humidity at 6 a.m.

Results and Discussion

The distribution of calvings for each hour of the day is illustrated for heifers and cows in Figure 1. If calving occurred randomly, then one would expect 4.2% of the cows or heifers to calve during each hour of the day. The pattern of calving was quite similar for heifers and cows. However, heifers had two peak hours of calving at 6 a.m. (6.4%) and 1 p.m. (7.2%), whereas cows had three peaks at 7 a.m. (6.4%), noon (6.9%), and 3 p.m. (5.9%). It is interesting that more ($P < .005$) calvings occurred between 6 a.m. and 6 p.m. (58%) than between 6 p.m. and 6 a.m. (42%), corresponding to daylight and darkness. The sun rose, on the average, at 6:43 a.m. and set at 5:33 p.m. during the study.

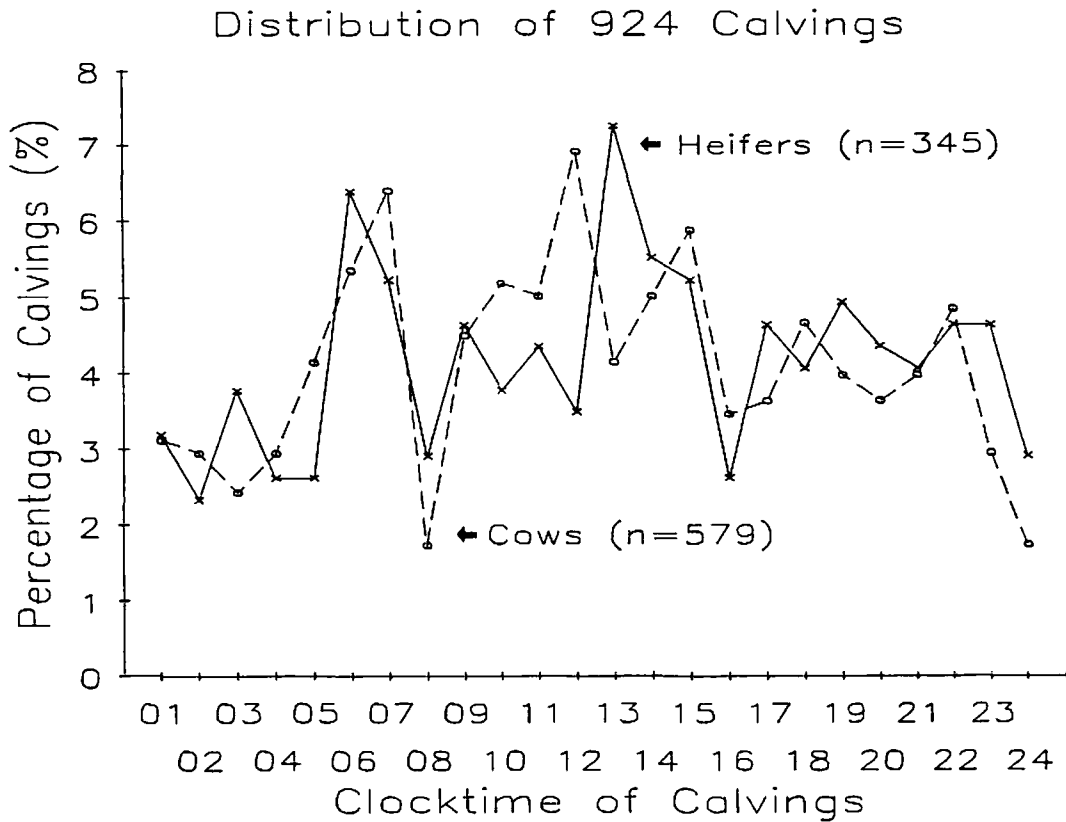


Figure 1. The Percentage Distribution of 924 Calvings, including 345 Heifers and 579 Cows, during the Fall of 1985.

There appeared to be little relationship between the climatological variables measured during 7 days preceding calving and the onset of calving. Changes in the barometric pressure and amount of precipitation during the week before parturition are shown in Figure 2. Barometric pressure was lowest 4 days before calving, and calving occurred during a period of increasing pressure. These results are in agreement with two previous studies in which calving occurred during a period of rising barometric pressure that generally followed the passage of a warm front. The average amount of rainfall was fairly constant prior to calving.

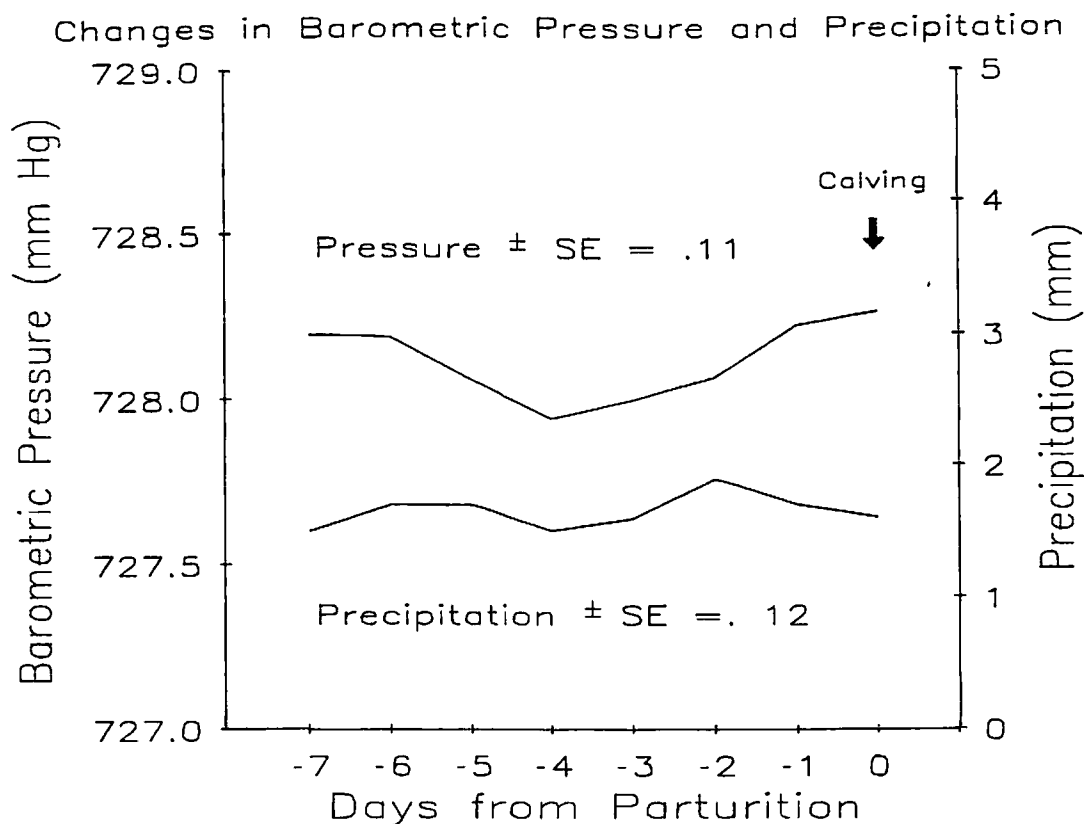


Figure 2. Changes in Average Barometric Pressure and Average Precipitation (Water Equivalent) during the Week Preceding Calving (Parturition).

Changes in wind velocity, percentage sunlight during daylight hours, and relative humidity is illustrated in Figure 3. Wind velocity averaged 12 mph (19 km/h) and humidity averaged 82%. Neither of these climatological measures changed appreciably during the week before calving. Percentage sunlight declined from 73 to 68% during the week before parturition.

Changes in daily temperatures are illustrated in Figure 4. Daily temperatures fluctuated on a daily basis from average highs of 64°F (18°C) to average lows of 45°F (7°C). Daily temperatures declined slightly preceding calving.

Some observations of altered times of calving have been reported by various producers and researchers over the last 8 yr. It had been suggested that feeding pregnant cattle in the late afternoon to late evening hours might increase the proportion of calvings that occurred during the daylight hours. In this study, springing heifers and dry cows were fed around 3 to 4 p.m. Furthermore, 58% of the calves were born during the daylight hours. It is possible that changing feeding times might allow for more daylight calvings when assistance of labor could be more readily available. This change in management might be helpful for dairy producers who maintain pregnant cows only in drylot and provide all fed at a feed bunk. Although these findings are preliminary, they are in agreement with other unpublished observations and reports.

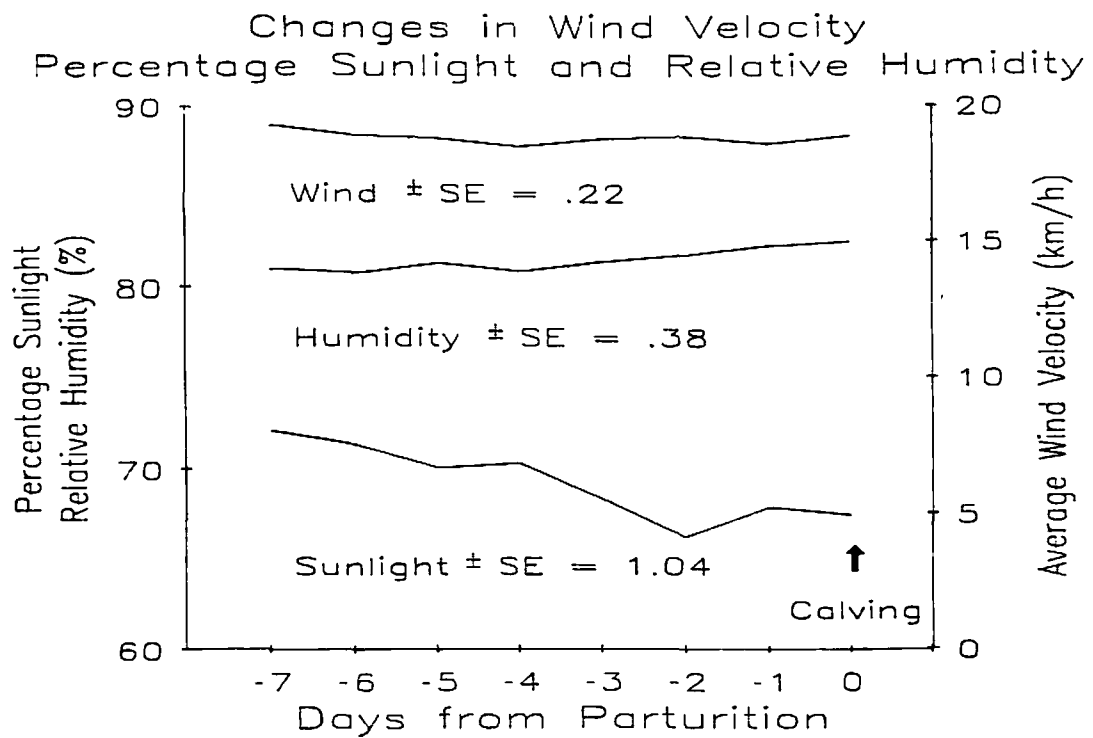


Figure 3. Average Changes in Wind Velocity, Percentage Sunlight during Daylight Hours, and Relative Humidity during 7 Days before Calving.

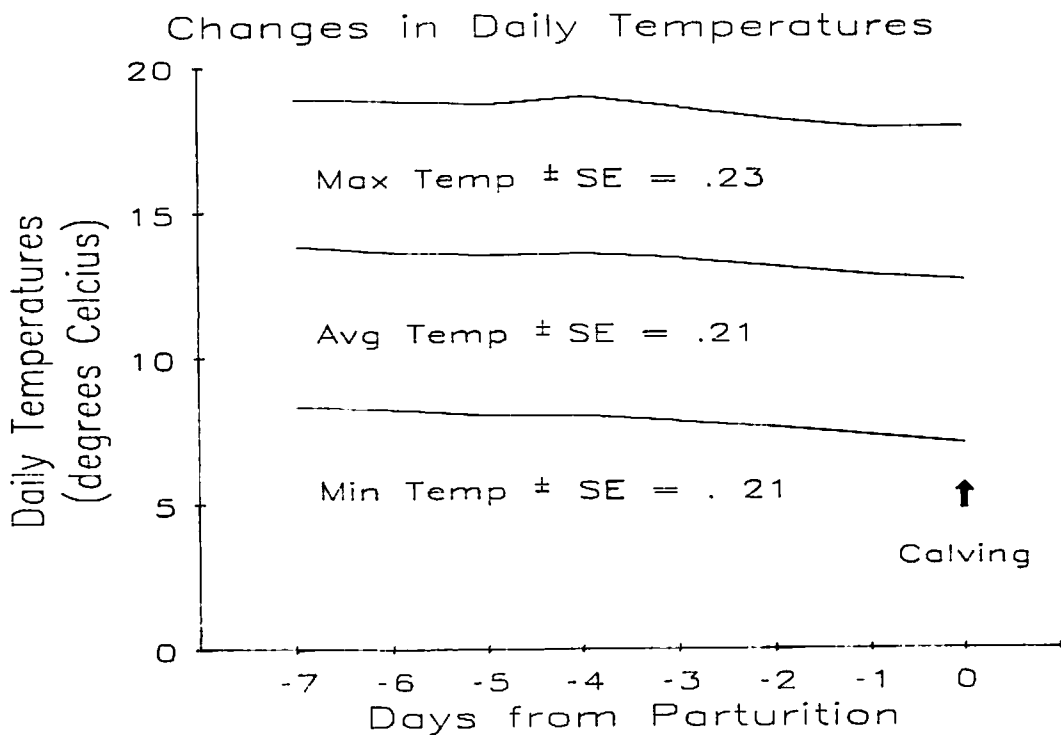


Figure 4. Changes in Daily Maximum, Minimum, and Average Temperatures during the Week before Calving.