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REPRODUCTIVE RATES OF RADIO-COLLARED FEMALES IN THE PORCUPINE CARIBOU HERD

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Abstract: Radio-collared females of the Porcupine Caribou (Rangifer tarandus granti) Herd were monitored closely during calving from 1982 through 1989. Calf production was determined in most cases by visual observation of a calf at heel, but was occasionally deduced from presence of hard antlers and/or a distended udder. Females that lacked both hard antlers and udders were assumed to be barren. None of 165 yearlings produced a calf and only 2 of 51 2-year-olds had calves (but both died within 24 hours). One hundred sixty-four 3+-year-old adult females were monitored, with yearly sample sizes varying from 9 to 89 cows and individuals being followed for 1 to 8 calving seasons. Annual calf production rates for 3+-year-old cows were 74-89%. Prior year status (barren, parturient, raising a calf through June, or losing a calf in June) was not significantly correlated with subsequent year pregnancy.

RESULTS

Annual Parturition Rates

1. Observed variation is not statistically significant, but sample sizes are inadequate to detect small differences that would be

biologically significant.

2. Two-year-olds have very low parturition rates; 3- and 4-year-olds also have lower parturition rates than older females.
3. Among females older than 4 years, there is no indication from our data that parturition rates change further with advancing age.
4. Much of the variation in the annual parturition rate among 3+-year-old radio-collared cows was probably due to the changing proportion of less productive 3- and 4-year-olds. Although the parturition rate among older cows only was more similar in most years, the range of variation remained about the same as for all 3+-year-old cows taken together.

Long-Term Reproductive Histories of Individuals

1. Individual females were followed for 1 to 8 calving seasons. Forty-seven females were available 3 or more seasons. Most of the females with long-term data were pregnant every year, or nearly so. Only a few were pregnant less than two-thirds of the time. One cow was barren in each of 8 seasons and was apparently physiologically sterile.
2. Discounting the sterile female, a cow's parturition status in one year was a poor indicator of her status the next. In other words, parturient cows were no more likely to get pregnant the next year than barren cows, and vice versa. This was true whether the data were pooled over all years for all females or were analyzed within years only. It was also true when only the

first pair of years or the last pair was counted for each cow.

Parturient cows could be broken down into 3 categories:

- those that lost calves within 48 hours (probable inviable births),
- those that lost calves during June (probable viable birth, but calf lost to predation), and
- those that raised calves through June.

In a simple lumping of data by these parameters for all years there was still no strong correlation between reproductive status one year and the next.

DISCUSSION

Radio-collared females were probably never representative of the female age structure in the population. It is clear that age structure among the collared cows could affect observed parturition rate, even if individual, age-specific fecundity were constant. This is undoubtedly true for populations, too. In other words, a large sample size and considerable knowledge about individual marked animals would be necessary to measure true variation in population parturition rates and ensure that observed variation was not a data artifact.

Hypotheses that the energetic costs of pregnancy and lactation can affect subsequent year conception and parturition are perhaps an

oversimplification of a complex relationship. Female physiological condition in the fall and its effect on ovulation, conception, and pregnancy is a product of many factors. In large, free-ranging herds where females face differential exposure to insect harassment, forage availability and quality, disease, and winter conditions, the specific costs of reproduction are only a small part of the overall energy budget. Also, identical reproductive costs may play decidedly different roles in the energy budgets of robust versus weaker cows. For practical field study purposes, information based solely on whether a cow is pregnant or not in one year may have little or no predictive value on her status the next.

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