NORTH KINGS FAWN PRODUCTION AND SURVIVAL: A PROGRESS REPORT

Hal Salwasser
University of California
Berkeley, California

Abstract. The results of research on the when, where, and why of fawn mortality in the North Kings Deer Herd is discussed. The "Late Gestation Nutrition Stress" hypothesis is presented as a possible explanation for early fawn loss. Other factors influencing fawn mortality are mentioned, and future direction of the study is outlined.

INTRODUCTION

The North Kings Deer Study is the research component of the North Kings Management Plan, a pilot program of deer herd and range management of a migratory deer herd on the west slope of the Sierra Nevada. The California Department of Fish and Game, the U. S. Forest Service, the Fresno County Sportsman's Club, California State Univ. Fresno and the Univ. of California Berkeley are cooperating in the research. The population of California Mule Deer (Odocoileus hemionus californicus) in the herd has declined over the past 15 years from approximately 13,000 deer to about 4,000 deer. The decline is a reflection of decreasing fawn survival over the same period from around 70 fawns per 100 does to 30 fawns per 100 does.

The range of the herd is about 790 square miles grading from a steeply sloped, foothill woodland-chaparral winter range of 1,500 to 4,000 ft. elevation to a more moderately sloped yellow-pine and red-fir summer range of 5,500 to 10,000 ft. elevation. Much of the summer range is in the general forest zone, with remaining portions in the John Muir Wilderness, in eastern Fresno County, California. Fire has been a historical factor on the winter range with over 40,000 acres burned during the last 20 years. The last major summer range fire occurred in the 1940's on lower elevation summer range. Commercial logging opens about 1,000 acres of forest yearly in the general forest zone. Winter et al. (1970) state that much of the summer range habitat is being replaced by climax forest. The loss of sub-climax deer habitat may be on the order of about 40,000 acres over the summer range (Ashcraft, pers. comm.). This loss is probably due to a combination of old age with a lack of regeneration, past over use by higher populations of deer and cattle, and a general closing of the forest canopy. The lack of fire on the summer range probably has a great influence on this loss.

I want to thank all the Department of Fish and Game Personnel who put so much effort into the study.

OBJECTIVE AND METHODS

The main objective of the study was to determine when, where, and why fawn mortality was occurring. The methods to achieve the objective consisted of autopsies to determine fetal rate, parasitism, physical condition of the does, breeding period and fawn drop period. Telemetry of collared does trapped on the winter range was to be used to determine fawning habitat preference, but mechanical difficulties, such as not being able to trap deer the first year, complicated this technique. Visual observations of deer in a selected study area were consequently used to ascertain when and where fawns were dying. Composition counts taken prior to fall migration were used to count fawns surviving through summer, and counts taken in December were used to determine total fawn survival.

RESULTS AND DISCUSSION

Productivity for prime reproductive does, 3 years+, was very high at 1.82 fetuses per 100 does. The sample size of younger does was to small to be used as a valid estimate, but 1 and 2 year class does autopsied were pregnant with 1 to 2 fawns each, at a lower average than prime does. The high productivity would seem to rule out pre-estrus or early pregnancy nutrition deficiency. All does autopsied were pregnant and 96% of CLP present were represented by fetuses. Physical condition of the does, measured by Riney's (1955) kidney fat index and Bischoff's (1954) body fat estimates, appeared to be good with a very slight drop toward fawning time. Physical condition data is still being evaluated. Breeding begins in late November, peaks in mid-December and ends in mid-January. Fawn drop occurs in late June and early July. Parasite search indicated no apparent disease or parasitism problem with the herd. There was no evidence of abortions, stillbirths or abnormal fetuses.

Field observations gave very little information about fawning habitat preference, a consequence of much wasted effort to make telemetry work, but I did notice a change in behavior patterns of deer during fawn drop consistent with that reported by White et al. (1972). Composition counts yielded information on the where and when of our objective in a general manner. About 60% of the fawns dropped had died by late August when composition counts showed 70 fawns per 100 does. Since productivity figures are given for prime does, and counts are taken for all does, I have arbitrarily selected 135 fawns per 100 does as a productivity value more attuned to what actually is the productivity of the herd in general for discussion purposes. Winter counts show a further drop in survival to about 30 fawns per 100 does, thus another 50% loss. There appear to be two phases of loss, one within 8 weeks of fawn drop and one during fall migration and adjustment to the winter range.

Verme (1962) reported a significant size and mortality difference of fawns from penned deer kept on various nutrition diets, those from poor diets being smaller and more prone to early mortality. Using hindfoot length as a measurement of skeletal development and weight, I plotted the ratio of weight in grams to hindfoot length in millimeters against age in days to get an idea of fetal development from the autopsied does. The ratio, which I call the fetal condition factor, showed a tight scatter up to 130 days of growth, after which the scatter increased, giving as much as a 100% difference in fetal condition between fetuses just prior to fawn drop. This variation may reflect a nutrition stress on the does during late gestation much like that experimentally induced by Verme. I am hypothesizing that this late gestation nutrition stress is resulting in weakened fawns being dropped and early mortality of those in poorest condition.

This hypothesis could probably only explain the early phase of loss, so it is likely that an entirely different set of factors influence the second phase. My thoughts at this time are very speculative, but possible areas of concern may be poor weening forage due to competition earlier in the summer between cattle and deer for preferred plants and increased predation due to reduction of cover as the brush fields die and deer are forced onto clear cuts. I did not anticipate finding a two phase loss initially and need of much more data on the second phase before formulating a valid hypothesis.

The fawn production and survival study is continuing under the direction of Dr. Starker Leopold at U.C. Berkeley with the objectives of learning more about the late gestation period of the does, increasing knowledge of when and where fawns are dying, and determining

the forage requirements of fawns during weening and migration. I am recommending a continuation of an ongoing deer and cattle diet study as well as new studies on the range plant composition and phenology, and a predator-prey relation study. The loss of old brush fields from the range indicates a change in plant composition over the 15 year period. It is well accepted that there are coyotes on the range eating deer. An understanding of the importance of the two latter factors along with possible competition between deer and cattle to the production and survival of fawns is necessary before we can apply management techniques to a migratory deer herd with any predictability of the results of our manipulations.

LITERATURE CITED

Bischoff, A. I. 1954. Limitations of the bone marrow technique in determining malnutrition in deer. West. Assc. State Game and Fish Comm. 34:

Riney, T. A. 1955. Evaluating condition of free-ranging red deer (Cervus elaphus) with special reference to New Zealand. N. Z. Jour. Sci. and Tech. 36(5): 429-463.

Verme, L. J. 1962. Mortality of white-tailed deer fawns in relation to nutrition. Prac. Natl. Deer Disease Symp. 1: 15-38.

_____. 1963. Effect of nutrition on growth of white-tailed deer fawns. N. Am. Wildl. Conf. Trans. 28: 431-443.

White, M., F. F. Knowlton, and W. C. Glazener. 1972. Effects of dam-newborn fawn behavior on capture and mortality. J. Wildl. Manage. 36(3): 897-906.

Winter, F. A., G. Ashcraft, and B. Stewart. 1970. North Kings deer herd management plan. U.S.F.S. Sierra Natl. Forest Publ.