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Use of Rearing Cover by Mearns Cottontail

BY RAYMOND L. LINDER AND GEORGE O. HENDRICKSON

Intensive research on the Mearns cottontail was conducted from March 26 to September 18, 1954, on an 80-acre tract of the Floyd Fleming farm in Decatur County, Iowa. The cover on the 80 acres was alfalfa for hay 13 acres, alfalfa in pasture 21 acres, grass in pasture 8 acres, corn 22 acres, fallow grassland 11 acres, and trees, shrubs and vines along fencelines and gullies and in a catalpa planting about 5 acres. The plants of the fallow grassland, fencelines and gullies were listed by Hubbard and Hendrickson (1952) in some detail.

The summer, and the preceding fall and winter, were characterized by periods of drought. During a period, from June 16 to July 21, no rainfall was recorded and the average maximum daily temperature was 96.5 degrees Fahrenheit.

Cottontails, trapped with 49 wooden box traps and 10 Havahart metal traps, were ear-tagged and tail-dyed. In all, 59 rabbits were captured, of which 12 were adults and 47 were juveniles. The adults were evenly divided in sexes. Of the juveniles 25 were females and 22 were males in a sex ratio of 114 females to 100 males.

Population estimates were made with the Lincoln index modified by a factor obtained from life history data, as described by Kline and Hendrickson (1954) and shown by Crunden and Hendrickson (1955) to be most suitable for population estimation at this area in comparison with several other formulas. The adult breeding population, on April 1, was estimated to be 18 cottontails on the area of 80 acres. The peak population was attained on July 31, when an estimated 53 cottontails were on the area to indicate a productivity rate of 194 percent. The population at the conclusion of the study, September 18, had dropped to an estimated 29 cottontails, or one cottontail to 2.8 acres.

Nest search was conducted daily and repeated at 2-3 day intervals on the more favorable fields. As a cottontail nest is covered with materials gathered nearby and blends with its surroundings, it is seen with difficulty. The observer, following lines at intervals of 3 feet, as he walked slowly, looked for small bare patches of soil, which the females had scratched from the nest cavities and deposited immediately in front of them, and for plant debris in slight motion indicating movement of young in a nest. Also, he listened for squeals

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uttered by nestlings.

To determine the success of nests these criteria were established. A used nest had in the nest cavity, or nearby, an outer lining of plant materials and an inner lining of hair. The nest may have been taken out of the cavity by some agent. Also, a used nest had been observed to contain young cottontails, or was judged to have been occupied from evidence, such as small fecal pellets in the nest materials and matted hair at the bottom. An incomplete nest had plant materials only, or in addition had hair lining, without any indication of occupancy by young rabbits. An indefinite number of shallow excavations that may have been made by female cottontails were not considered to be nests, for they contained no lining materials. A used nest from which some, or all, of the material had been removed, and usually seen near the cavity, was considered unsuccessful, for it was assumed that a predator had consumed the occupants upon discovery of the nest. An evacuated, used, undisturbed nest from which young very probably had emerged when old enough to be independent of the mother, at about two weeks of age, was termed successful.

Of 80 nests found, 8 were of the previous year and 72 were of the year of the study. Twenty were incomplete and 52 were used in 1954. Of the 52 used nests, 26 were successful and 26 were unsuccessful. May was first in nest construction with 14 nests, April and July with 10 nests each tied for second, and June and August with 4 nests each tied for third, so far as the nests could be dated on the bases of measurements of young and appearances of nests at the time of discovery.

Of recent construction when found, 30 nests were used for surrounding nesting cover analysis to indicate that 13 nests were at sites which were at least 5 to 10 percent bare of vegetation, 10 were at sites with 10-70 percent bare ground, and 7 were in dense vegetation close to the nest. More nests were found in sites with at least 10 percent grass cover than in sites with forb or shrub cover at least 10 percent. Of the grasses, bluegrass was the most common and formed at least 10 percent of the cover at 13 of the 30 nest sites. Bluegrass was more common in the nesting cover at sites found before July 1 than of those observed later.

Escape cover, to which cottontails fled often, consisted of briar patches, thickets, fenceline shrubbery and herbs, waterway herbs, gully vegetation, woodchuck dens and culverts. To determine the relation between most readily available escape cover and nests, the distances between were measured and found highly variable. The mean distance was 64.7 feet with a standard deviation of ± 60.8 and a range of 0 to 262.

The average nest excavation was 7.1 inches long with a standard deviation of $\pm .85$ and a range of 6 to 10 inches, 5.6 inches wide

with a standard deviation of $\pm .47$ and a range of 3 to 7 inches and 4.8 inches deep with a standard deviation of $\pm .86$ and a range of 2 to 7 inches. The average patch of excavated soil, or platform, in front of nests was 9.5 inches long with a standard deviation of ± 1.05 and a range of 6 to 14 inches, and 8.7 inches wide with a standard deviation of ± 2.05 and a range of 6 to 14 inches.

The material composing the 52 used nests was 47 percent of hair from the abdomens of female cottontails and 53 percent of plant origin. The plant material ranged from tree to shrub leaves and twigs to leaves and stems of forbs and grasses. Of 5 recognized grasses bluegrass was more numerous than the other 4 together.

Sites in which nests were located were classed as well, medium, or poorly drained. Of 80 nests, 55 were in well drained areas, 13 in medium drained areas and 12 in poorly drained areas.

The average number of young in 7 litters in nests and 2 foetal counts was 6.3 with a standard deviation of ± 1.4 and a range of 5 to 8 young. Of 19 nestling cottontails 11 were females and 8 were males in a sex ratio of 137 females to 100 males. By estimation from trapping data, measurements of young and relationship of those trapped to probable nests producing them, 15 litters of 80-90 young left nests safely, or in other words, were produced on the 80 acres.

The young of both sexes tended to spread at equal distances from the nest sites. The average distance between nest site and farthest point of capture was 544.6 feet for juvenile males and 686.2 feet for juvenile females. The difference between means was not statistically significant at the .05 percent level. The average distance between farthest points of capture for juvenile males was 428.5 feet and the average distance between farthest points of capture for juvenile females was 298.8 feet. The difference between means of distances traveled by the sexes was not statistically significant at the .05 percent level.

Members of the litters produced early in the summer tended to use the permanent cover of the waterways and fencelines more than did the members of the litters produced later when additional tall herbaceous cover was more widespread. Two adults and a juvenile were flushed at the first mowing of 13 acres of alfalfa on June 21, and none at the second cutting September 28. The second cutting was very light following a July drought and heavy grasshopper damage. The closely grazed alfalfa pasture and grass pasture had little cottontail use, as indicated by fecal pellet distribution and by observations for rabbits. The fallow grassy tract of 11 acres was credited with production of 7 of the estimated 15 litters. The cornfield of 22 acres, with a good growth of weeds,

showed heavy use by cottontails, as indicated by flushing and by fecal pellet distribution, from August 1 to its harvest for ensilage on September 26.

Three male and 4 female cottontails tagged by Crunden (1953) in the previous year were captured in 1954. Three of the 7 bore tails yellow with picric acid applied by Crunden. One dyed on October 28, 1953, had a bright yellow tail when trapped on April 30, 1954, 6 months later. In 1954 the trapped adult males were tail-dyed with picric acid solution, the adult females with National Safranine-red, and the young with National Victoria green. The red and green on tails were not detectable in the field longer than about 30 days after application.

Losses of cottontails from traps, blamed mostly to raccoons, were lessened greatly with the use of a trap door locking device described by Linder and Hendrickson (1956). Flooding by heavy rains was blamed for the losses at 4 nests. At a nest found on June 2, following a rainfall of 1.5 inches, the 7 nestlings about 3 days old were dead from probable chilling within a day. The top nest cover had been washed off and the nest was filled with water. Farmers tell frequently about nests drowned out to account for poor cottontail production. No nestlings were known to have perished from extreme summer heat, parasites or diseases. Destruction at 12 other unsuccessful nests was assigned as follows: 2 to farming operations, 2 to skunks, 1 to a dog and 7 to unknown mammals. No attempt was made to determine losses of cottontails taken by predators in the open.

In summary, in research from March 26 to September 18, 1954, on 80 acres of agricultural land in southern Iowa, an estimated breeding population of 18 Mearns cottontails increased to a peak of an estimated 53 rabbits on July 31, which decreased to an estimated 29 cottontails on September 18. Of 80 nests found 8 were of 1953, and for 1954 20 were incomplete, 26 were successful and 26 were unsuccessful. Most nests were in grassy cover in which bluegrass prevailed. The mean distance between nest sites and escape cover was 64.7 feet with a range of 0 to 262 feet. The average number of young in 7 litters of nestlings and 2 foetal counts was 6.3 with a range of 5 to 8 young. Conservatively, an estimated 15 litters of 80-90 young accounted for by observation, trapping and measurements, were produced to leave nests safely. A fallow grassy tract of 11 acres produced 7 of the estimated 15 litters. Following a period of drought, with consequent lessened plant growth and grasshopper and cattle grazing damage in hay fields and pastures, cottontails used the weedy cornfield heavily until it was cut for ensilage on September 26. Data on nest materials and dimensions were obtained.

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