DEER TRAPPING CORRELATED WITH WEATHER FACTORS

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ABSTRACT. — Deer (*Odocoileus virginianus*) trapping success on Crab Orchard National Wildlife Refuge was correlated with weather factors during the 1963-64 and 1964-65 winter trap periods. There was negative correlation with temperature and relative humidity during the former period and with rainfall during the latter period.

Trapping, although requiring fewer man-hours than most methods of deer capture (Hawkins et al. 1967), is expensive. Deer trapping results on the Crab Orchard National Wildlife Refuge (CONWR) from October 1963 through April 1964 and November 1964 through March 1965 are correlated with weather factors in an attempt to reveal the most appropriate conditions for success, thus reducing cost.

The study area was the approximately 18,000-acre, inviolate portion of CONWR. Four broad habitat types were dominant: cropland including fallow areas (27 percent), pasture (17 percent), brush (27 percent) and timber (29 percent).

METHODS

Deer were captured in corral and box traps placed in wooded areas and baited with shelled corn. Six corral and three box traps were used; however, not all traps were set each night. Because previous study indicated that corral and box traps yielded similar results in the capture of deer (Hawkins et al. 1967), data for each were combined for analyses.

Trapping was done on 130 nights during October 1963 through April 1964 and November 1964 through March 1965; however, data were deleted when less than three traps were set. As a result, 62 and 32 trapping nights were available for analyses for the former and latter periods, respectively.

Weather data were obtained from the following sources: temperature and precipitation, U.S. Weather Bureau station at Carbondale; barometric pressure and relative humidity, Climatology Laboratory, Southern Illinois University; and wind speed and direction, cloud cover and moon phases by the investigators. The U.S. Weather Bureau station and the Climatology Laboratory were located about 10 miles west of the study area.

The trap data were transferred to 80-column IBM cards. To eliminate redundant factors, a factor analytic technique (Harmon 1960) was employed on the 39 independent variables (Table 1) considered. The factors isolated in the factor analysis for each trap period were then submitted to a correlation and multiple regression analysis (MRA) against the dependent variable, trap success (percent of traps set that had one or more deer). The analyses were performed on an IBM 7040 computer in a stepwise fashion where the least

TABLE 1.—Independent variables possibly influencing trap success of leer or Crab Orchard National Wildlife Refuge, October 1963 through March 1965.

Variable Number	Description of Variable	Variable Number	Description of Variable
1*	Average days traps open between settings	22	Change in low relative humidity from previous day to day traps set
2	High temperature (F) day traps set	23	Change in high relative humidity from day traps set to next day
3	Low temperature (F) day traps set	24	Change in low relative humidity from day traps set to next day
4*	Range from high to low temperature	25*	High barometric pressure day traps set
5	Change in high temperature from previous day to day traps set (plus temperature indicates rise while minus shows loss)	26	Low barometric pressure day traps set
6	Change in low temperature from previous day to day traps set	27	Range from high to low barometric pressure day traps set
7*	Change in high temperature from day traps set to next day	28	Change in high barometric pressure from previous day to day traps set
8	Change in low temperature from day traps set to next day	29	Change in low barometric pressure from previous day to day traps set
9	Rainfall (inches) day traps set	30	Change in high barometric pressure from day traps set to next day
10	Snowfall (inches) day traps set	31	Change in low barometric pressure from day traps set to next day
11	Snowfall accumulation (inches) day traps set	32	Cloud cover
12	Rainfall day before traps set	33	Wind speed (miles per hour)
13	Snowfall day before traps set	34	Wind direction
14	Snowfall accumulation day before traps set	35*	Moon phases
15	Rainfall day after traps set	36	Barometric pressure 1800 day traps set
16	Snowfall day after traps set	37	Change in barometric pressure from midnight to 1800 day traps set
17	Accumulation of snow day after traps set	38	Change in barometric pressure from 0600 to 1800 day traps set
18*	High relative humidity on day traps set	39	Moon phases
19*	Low relative humidity on day traps set		
20*	Range from high to low relative humidity on day traps set		
21	Change in high relative humidity from previous day to day traps set		

* Deleted from 1964-65 trap period.

significant variable was dropped one at a time until only the most significant factor remained. Statistical analyses computed at each step included R-square, F-ratio, *t*-tests and levels of significance.

Results

1963-64 Trap Period

The 39 independent variables were loaded on 12 factors when the factor analysis was performed. The independent variable under each factor that contributed most to trap success was chosen for the MRA; these were 1, 3, 5, 7, 12, 17, 18, 24, 26, 34, 35 and 37 (Table 1). The MRA of the 12 independent variables showed that they contributed 36 percent to trap success ($R^2 = 0.36$, $P < 0.01$ with 49 df). Four of these (3, 7, 18 and 26) had significant *t*-test values ($P < 0.05$, 57 df), and acting together contributed 28 percent to trap success ($R^2 = 0.28$). Correlation of these factors revealed that they were all negatively correlated with the dependent variable, but only variables 3 (Low temperature (F) day traps set) and 18 (High relative humidity day traps set) had significant *r* values ($P < 0.05$; $r = -0.29$ and -0.30, 60 df).

1964-65 Trap Period

The 12 independent variables that contributed most to trap success during this period according to factor analysis were 8, 9, 10, 17, 20, 23, 28, 30, 31, 32, 36 and 39 (Table 1). MRA revealed that they contributed 39 percent ($R^2 = 0.39$) to trap success which was not significant ($P > 0.05$, 19 df). However, three of these (9, Rainfall (inches) day traps set; 10, Snowfall (inches) day traps set; and 36, Barometric pressure 1800 day traps set) acting together contributed 34 percent ($R^2 = 0.34$) to trap success ($P < 0.01$, 28 df). Of these, only variable 9 (Rainfall (inches) day traps set) had a significant *r* value ($P < 0.01$, $r = -0.48$ with 30 df) and contributed 23 percent ($R^2 = 0.23$) to trap success.

Discussion

The stepwise MRA for the first trap period suggested that, when considered together, a relatively low temperature and humidity and a relatively high barometric pressure were conducive to improved trap success; during the second period, rain hampered trapping, snow contributed to it and, as with the first period, a higher barometric pressure aided trapping. When considered alone, temperature and relative humidity were negatively correlated with trap success during the former period, while rainfall was negatively correlated during the latter period.

The average low temperature on days when traps were set was about 28 F (0-62) for each trap period. The average high relative humidity on days when traps were set was 86 (52-100) for the first period and 99 (96-100) for the second period affording little opportunity for correlation during the latter period. An average of 0.35 inches of rain occurred on 14 of the 62 trapping days (22.6 percent) during the first period, while an average of 0.56 inches fell on 8 of 32 (25 percent) days during the latter period, possibly accounting for the increased importance of rainfall to trap success during the latter period.

Temperature probably influenced trap success by altering the feeding preferences of deer on a daily basis. Observations have shown that on warm days, especially in late winter and early spring, deer feed on greens such as wheat and red clover in preference to bait corn; conversely, in the fall a relatively cold day induces feeding on bait corn although greens are still available. This may be an adaptation to conserve a positive energy balance as suggested by Moen (1968, p. 343) for deer in agricultural areas in Minnesota. Since trapping began earlier (October) and lasted longer (April) during 1963-64 than 1964-65, this influence was more pronounced during the former period.

High relative humidity and rainfall probably exerted their influence by restricting the activity of deer. Barick (1952) had better results in North Carolina when trapping just prior to low pressure storms. Hahn (1949) found that deer were most active during cloudless days of low relative humidity and as the relative humidity increased, deer movements decreased.

In conclusion, it appears that deer capture may be enhanced by trapping on relatively cold, dry days with a high barometric pressure.

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