



The ecology of the greater prairie chicken as related to reintroductions  
by John Edward Toepfer

A thesis submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in  
Biological Sciences  
Montana State University  
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**Abstract:**

This study was initiated in 1972 to examine nesting and brood rearing ecology of the prairie chicken in central Wisconsin. The study was expanded to include movements and habitat use of resident and transplanted birds and to evaluate pen-reared and transplanted wild birds in reestablishing a population in northwestern Wisconsin. Mean weights and breast circumferences of pen-reared birds were significantly less than those of wild birds. A total of 223 pen-reared and 60 wild prairie chickens were released from 1974-77 and 55 pen-reared, 29 transplants and 54 resident birds were radio-tagged. Ninety percent of the radio-tagged pen-reared birds were dead within a month. Over 80% of the losses of radio-tagged birds were attributed to predation. Pen-reared birds were more susceptible to mammalian predation than wild birds. Annual survival of wild, transplanted and pen-reared birds was 48%, 24% and 0.5% respectively. Pen-reared birds were more observable and attracted more raptors than wild birds. Flushing distances of pen-reared birds were half those of wild birds. Pen-reared birds remained within 2 km of their release sites and their movements were most like those of wild birds during summer. Movements of transplanted birds during April were characterized by an orientation period of 0-55 days when individuals made large wandering moves that at times exceeded 16 km. Daily movements and ranges of transplants were 2-20 times larger than those of resident birds. However, movements of birds transplanted in August were comparable to those of resident birds. Habitat analysis indicated that prairie chicken habitat was a mix of undisturbed, disturbed grassland and agriculture. The critical habitat component was grass or grass forbs cover in the 25-100 cm height range that was used for nesting, roosting and brood rearing. Agriculture was used for feeding. Habitat information is presented on an annual, seasonal and weekly basis by day and night for two areas.

Additional information is presented on flocking, the relationship to the booming ground, nest, weight dynamics, seasonal survival, effects of removal on local populations, costs, survival and behavior inside the pen. Recommendations are given with regard to future reintroductions and habitat management.

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APPROVAL

of a thesis submitted by

John Edward Toepfer

This thesis has been read by each member of the thesis committee and has been found to be satisfactory regarding content, English usage, format, citations, bibliographic style, and consistency, and is ready for submission to the College of Graduate Studies.

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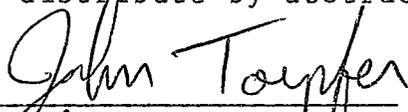
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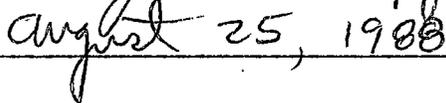
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## VITA

John Edward Toepfer was born on September 7, 1948 in Sheboygan, Wisconsin. He enrolled at Wisconsin State University at Stevens Point in September 1966 and received his Bachelor of Science degree in Wildlife Management in June 1970. He entered the University of Wisconsin at Stevens Point in August 1971 and received a Masters of Science in Natural Resources-- Wildlife in May 1976. He was employed as a field researcher by the University of Wisconsin Stevens Point from September 1975 through April 1978. From May 1978 to March 1980 he was employed as a Fish and Wildlife Biologist by the Delaware Division of Fish and Wildlife. He began studies towards a Doctor of Philosophy degree in Fish and Wildlife Management in March 1980.

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## ABSTRACT

This study was initiated in 1972 to examine nesting and brood rearing ecology of the prairie chicken in central Wisconsin. The study was expanded to include movements and habitat use of resident and transplanted birds and to evaluate pen-reared and transplanted wild birds in reestablishing a population in northwestern Wisconsin. Mean weights and breast circumferences of pen-reared birds were significantly less than those of wild birds. A total of 223 pen-reared and 60 wild prairie chickens were released from 1974-77 and 55 pen-reared, 29 transplants and 54 resident birds were radio-tagged. Ninety percent of the radio-tagged pen-reared birds were dead within a month. Over 80% of the losses of radio-tagged birds were attributed to predation. Pen-reared birds were more susceptible to mammalian predation than wild birds. Annual survival of wild, transplanted and pen-reared birds was 48%, 24% and 0.5% respectively. Pen-reared birds were more observable and attracted more raptors than wild birds. Flushing distances of pen-reared birds were half those of wild birds. Pen-reared birds remained within 2 km of their release sites and their movements were most like those of wild birds during summer. Movements of transplanted birds during April were characterized by an orientation period of 0-55 days when individuals made large wandering moves that at times exceeded 16 km. Daily movements and ranges of transplants were 2-20 times larger than those of resident birds. However, movements of birds transplanted in August were comparable to those of resident birds. Habitat analysis indicated that prairie chicken habitat was a mix of undisturbed, disturbed grassland and agriculture. The critical habitat component was grass or grass forbs cover in the 25-100 cm height range that was used for nesting, roosting and brood rearing. Agriculture was used for feeding. Habitat information is presented on an annual, seasonal and weekly basis by day and night for two areas. Additional information is presented on flocking, the relationship to the booming ground, nest, weight dynamics, seasonal survival, effects of removal on local populations, costs, survival and behavior inside the pen. Recommendations are given with regard to future reintroductions and habitat management.

Cano.

Fl<sup>o</sup>

## INTRODUCTION

The introduction of wild-trapped and pen-reared birds to establish populations into vacant habitat is a common wildlife management practice. Most of these efforts have been unsuccessful and costly in terms of money, manpower and wildlife resources. In addition to being characterized by limited success, such efforts have been poorly documented and have provided limited information on the behavior, movements and fates of released individuals. The information that is available has been based on casual observations and/or band or tag recoveries that are usually received a considerable length of time after the release.

Lewis et al. (1962) indicated that minimal movement from the release site was the key to a successful transplant. However, movements and survival of released birds may vary within and between species and may depend upon whether the birds were pen-reared or wild trapped. Previous studies have indicated that transplanted wild birds frequently wandered and made large movements away from the release site (Grange 1948, ptarmigan [Lagopus lagopus]; Hamerstrom and Hamerstrom 1951, Farmes 1955; Ammann 1957, sharp-tailed grouse [Tympanuchus phasianellus]; Patterson 1952, sage grouse [Centrocercus urophasianus]; Jacobs 1959, greater prairie chickens,

[Tympanuchus cupido pinnatus]; and Southern 1970, herring gulls [Larus argentatus]).

Other studies have found that most pen-reared or relatively non-mobile species such as flightless waterfowl generally stay near the release site (Frye 1942, Baumgartner 1944, Buechner 1950, bobwhite quail [Colinus virginianus]; Ammann and Palmer 1958, Lewis et al. 1968, White and Dimmick 1979, ruffed grouse [Bonasa umbellus]; Proud 1969, Little and Varland, 1981, turkey [Meleagris gallopavo]; Williams and Kalmbach 1943, Schladweiler and Tester 1972, immature waterfowl; Leopold et al. 1938, MacNamara and Kozicky 1949, Roby 1951, Burger 1964, Hessler et al. 1970, Hartman 1974, and Myers 1971 ring-necked pheasant [Phasianus cholchicus]). None of the above studies compared the behavior, survival and movements of pen-reared and wild birds released in the same area at the same time. Krauss et al. (1987) and Roseberry et al. (1987) more recently have compared survival and general behavior of wild and pen-reared pheasants and quail released in the same area.

Over the past 125 years, efforts to re-establish the prairie chicken and heath hen [Tympanuchus cupido cupido] have met with little or no success (Gross 1928, Phillips 1928 and Kruse 1973). Jacobs (1959) indicated that in Oklahoma dispersal from release sites was a major problem with prairie chickens transplanted during the winter and

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