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# INTERACTIONS OF PHEASANTS AND PRAIRIE CHICKENS IN ILLINOIS<sup>1</sup>

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*Abstract:* A small population of pheasants (*Phasianus colchicus*) developed in the area of Jasper County prairie chicken (*Tympanuchus cupido pinnatus*) sanctuaries, although this area is outside the contiguous range of pheasants in Illinois. Interactions observed between these 2 species included aggressive harassment of prairie chickens by cock pheasants and parasitism of prairie chicken nests by hen pheasants. Both harassment and parasitism could adversely affect small remnant flocks of prairie chickens and preclude successful attempts to preserve or reintroduce prairie chickens in areas within pheasant range.

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In Illinois, as in most north-central states, the closure of hunting seasons on greater prairie chickens closely coincided with the initiation and expansion of pheasant stocking programs (Leopold 1931:101, 186, Phillips 1928). The once-plentiful chickens are now reduced to comparatively small remnant flocks or have been extirpated.

The remnant flocks of chickens in the Illinois counties of Jasper, Marion, Washington, and Wayne exist outside the contiguous range of the pheasant (Labisky 1975). However, since 1969, a small population of pheasants has developed on and in the vicinity of prairie chicken sanctuaries owned by The Nature Conservancy and the Illinois Department of Conservation in Jasper County. This population of pheasants probably originated from, and is being partially maintained by releases made by local sportsmen.

In this study, we describe the interactions between pheasants and prairie chickens we observed on sanctuaries in

Jasper County, and we discuss the possible implications of these interactions for the preservation of remnant and reintroduced flocks of prairie chickens.

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## METHODS

Westemeier (1972) described the study area. We observed interactions between pheasants and prairie chickens on booming grounds during annual censuses conducted from 1965 through 1978. We visited booming grounds approximately bi-weekly from October through December, weekly from January through mid-March, daily from mid-March through April, and weekly until mid-May. Observations by volunteers in blinds were made on major booming grounds during March and April.

Parasitism of prairie chicken nests by hen pheasants was recorded during nest searches made in June, July, and August each year since 1965 (Westemeier 1972).

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## RESULTS

### *Harassment on Booming Grounds*

Aggression by pheasants toward prairie chickens has occurred on booming grounds (Anderson 1969, Follen 1966, Sharp 1957) and at feeding stations (Sharp 1957). We have observed aggressive encounters between the species on and near booming grounds during every month that prairie chickens were present. In Illinois, prairie chicken cocks begin to visit booming grounds as early as September and often defend territories through fall and winter. However, most conflict apparently takes place during late March and April—the peak of the breeding season for chickens in Illinois and the time cock pheasants aggressively defend territories.

During March and April 1970–77, pheasants were observed on 104 (21%) of a total 506 blind-mornings. (One blind-morning represents 1 booming ground under observation from 1 or more blinds for 1 morning.) Cock pheasants harassed chickens on 45 (43%) of those 104 blind-mornings. In 78% of the instances of aggression, pheasants dominated chickens, with cock pheasants usually attacking subordinate (nonbreeding) cock prairie chickens.

The attacks varied in intensity and duration. They ranged from a brief confrontation and chase of a single chicken to a persistent chase of 1 or more chickens, sometimes until a chicken was flushed from the booming ground. In 3 cases, a cock pheasant repeatedly flushed and pursued a chicken in flight until the chicken flew more than 1,000 m from the area. Anderson (1969), Harger (1956), and Sharp (1957) reported similar prolonged aggression. Harger (1956) reported that a

pheasant returned and flushed 2 more prairie chickens from the booming ground. We also observed such repetitive attacks.

In addition, we witnessed the apparent domination of a flock of 80 prairie chickens (both cocks and hens) by a single cock pheasant on 30 December 1970. Our field notes state, “one cock pheasant dominating whole booming ground . . . aggressive persistent display with central prairie chicken cock . . . prairie chicken cock cowers and retreats repeatedly.” This single cock pheasant herded several of the more dominant prairie chicken cocks at will.

When physical contact was observed, the pheasant was generally the victor. We have seen only 1 prairie chicken actually defeat a pheasant in a fight. When prairie chickens dominated pheasants (22% of the total encounters), the initial rush of the pheasant, directed toward a dominant prairie chicken cock, was usually repulsed by 2–4 of the cocks holding central territories, simultaneously chasing the pheasant cock. Prairie chickens never pursued pheasants beyond the edge of the booming ground.

Anderson (1969:114) reported 4 occasions of pheasant interaction with prairie chicken hens. We saw a cock pheasant flush a hen prairie chicken from nest cover about 100 m from a booming ground and pursue her in flight for about 200 m. We also watched a cock pheasant (accompanied by a hen pheasant) rout a single male prairie chicken and return to actively court a prairie chicken hen; she avoided his attentions and left the booming ground. All other interactions of cock pheasants with hen prairie chickens that we witnessed were during general harassment of all chickens occupying the booming ground.

### **Nest Parasitism**

Pheasants have long been known to parasitize nests of other birds (Bennett 1936, Leedy and Hicks 1945, Leffingwell 1928, Nickell 1966). Parasitized prairie chicken nests have been found on Jasper County sanctuaries every year (except 1977) since the first one was found in 1970. In every case, the pheasant was without doubt the parasitic egg layer because the nest bowl contained only prairie chicken feathers—no pheasant feathers. Nests with only pheasant eggs contained pheasant feathers but no prairie chicken feathers.

Parasitized prairie chicken nests were less successful than nonparasitized chicken nests (adjusted  $\chi^2_{(1)} = 6.13$ , Ref.  $\chi^2_{(1)} 0.025 = 5.02$ ). Of 17 parasitized prairie chicken nests found in the 9-year period, only 4 (24%) were successful, 2 (11%) were abandoned, and 11 (65%) were destroyed by predators. Of 480 nonparasitized nests of known fate found in the same period, 245 (51%) were successful, 33 (7%) were abandoned, and 202 (42%) were destroyed by predators. Through 1977 we found 51 pheasant nests—46 of known fate. Of these 46 nests, 21 (46%) were successful, 5 (11%) were abandoned, 19 (41%) were destroyed by predators, and 1 (2%) was destroyed by a hay mower.

Clutch sizes of parasitized nests varied from 1 to 15 prairie chicken eggs and from 1 to 7 pheasant eggs. The largest combined clutch contained 12 prairie chicken eggs (none hatched) and 7 pheasant eggs (5 hatched). All the prairie chicken eggs contained full-term embryos and 1 had begun to pip the shell. The chicken apparently left with the parasitic brood before her own eggs hatched. Prairie chicken eggs require at least 25 days of incubation (A. D. Kruse, 1979, James-

town, ND, pers. commun.); pheasant eggs require 23 days (Leffingwell 1928).

Bennett (1936) reported that parasitism by pheasants apparently reduced clutch size of duck nests. We found no evidence that parasitism by pheasants reduced the clutch size of prairie chicken nests. The average clutch size of 6 parasitized prairie chicken nests known to be incubated was 11.7 eggs; average clutch size of prairie chickens in Illinois is about 12 eggs (R. L. Westemeier, unpubl. data, Yeatter, 1943:391). However, 6 nests are too few to be used as conclusive evidence.

The presence of pheasants also appeared to increase the rate of nest abandonment by chickens. Prior to 1969, only 2 (1.7%) of 120 prairie chicken nests were found abandoned. During 1969–77, 36 (7%) of 520 prairie chicken nests were found deserted. Again, sample sizes are too small to draw definitive conclusions.

### **DISCUSSION**

Bennett (1936) pointed out that little attention had been given to determining the effects of pheasants on native plants and animals. The questions he raised are still unanswered over 40 years later. Although changes in land use have been primarily responsible for declines in prairie chicken populations, the pheasant may have contributed to those declines through the kinds of interactions we have seen and possibly others we have not seen.

Harassment of prairie chicken cocks by cock pheasants on booming grounds disrupts courtship displays and the ordered territoriality of the chickens. Most aggression by pheasants is directed toward subordinate cocks on the edges of booming grounds. Therefore, unless they are particularly aggressive, cock pheasants appear to have the least effect on

large booming grounds. However, on small booming grounds with only a few displaying males (which are common in declining, remnant flocks and in most reintroduction attempts), pheasants can easily disrupt the grounds to the extent that breeding could be delayed or prevented. Sharp (1957:243) contended that daily attacks by pheasants drove chickens "from long-established booming grounds." Although we have observed shifts in some booming grounds, we cannot attribute these movements to harassment by pheasants.

Pheasant attacks or displays toward prairie chicken hens nearly always cause the hens to leave a booming ground. Such attacks during the breeding season delay, and may prevent, some hens from being mated.

Parasitism of prairie chicken nests by hen pheasants has not been reported previously. This parasitism probably occurs in other states where the ranges of the 2 species coincide. Nest parasitism by pheasants in Illinois reduces the potential production of prairie chickens by reducing the rate of nest success, possibly as a consequence of increased predation.

#### MANAGEMENT IMPLICATIONS

The interactions of pheasants and prairie chickens should be considered when establishing management policies for prairie chickens. For example, Texas has prepared an Environmental Impact Assessment concerning the effects on Attwater's prairie chickens (*Tympanuchus cupido attwaterii*) of introducing pheasants in the Texas Gulf Coast prairie and has established policy that no releases of pheasants by the Parks and Wildlife Department will be made "within 10 miles of occupied prairie chicken habitat" (Philip K. Evans, 1978, Austin, TX, pers.

commun.). We believe this policy should be the minimal effort to avoid potential conflict between an introduced species and an endangered native species.

Our attempts to control aggressive cock pheasants on booming grounds have, thus far, proven futile. Removing 1 offending cock pheasant merely allows a subordinate successor to assume the same territory. For example, in 1977, 2 troublesome cock pheasants were successively removed from a major booming ground on 20 April and 26 April. On the morning the second cock was eliminated (at 0451, CST), a third cock was heard crowing progressively closer to the booming ground, even before the observer left the blind at 0745. By 7 May, a cock pheasant was again observed charging and flushing several male chickens among the 18 cocks and 1 hen present. Avoiding potential interspecies conflict by restricting pheasant stocking seems preferable to attempting to control the problem later.

Consideration should be given to possible interspecific conflicts when attempting to reintroduce prairie chickens into restored habitat. Restocking prairie chickens on recently established prairie areas is currently being considered in Iowa (Ronnie R. George, 1978, Chariton, IA, pers. commun.). It seems advisable to attempt such reintroductions only in areas or years, or both, of minimal pheasant populations.

Both Leopold (1933:83) and Mohler (1952) reported secondhand information on pheasants killing prairie chickens. Interactions between chickens and pheasants are worthy of further study. We do not know the extent of competition for nest sites or brood cover. Defining habitat usage of the 2 species vegetatively, structurally, temporally, and spatially

may allow interspecies conflict to be minimized by appropriate habitat management. Except on booming grounds and at feeding stations, the behavior of either species in the presence of the other is still largely unknown. The known interactions probably have been, and will continue to be, detrimental to small flocks of chickens whose continued existence depends on the successful mating of a few hens and a high rate of nest success.

The competitive exclusion principle of Gause (1934) should not be ignored. We must recognize the potential for interspecific competition of an exotic with a native species to result in the elimination of the weaker, less dominant species. Such competition may be most intense when the 2 species occupy roughly equivalent ecological niches in habitat that is marginal for 1 or both species.

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