



The National Wild Pheasant Conservation Plan

Key Literature:

Agricultural practice effects on pheasant habitat, abundance, and demographics

Last Updated: December 18, 2016

Note: The literature cited below represents a subset of the information used when making pheasant management decisions related to this topic. It is intended to provide a general sense of the primary research available on the subject, but is not comprehensive. Other information on the topic may also be available in books and technical bulletins that do not lend themselves well to this form of summarization. The list will be periodically updated upon request by National Wild Pheasant Technical Committee members.

Rodgers, R. D. 2002. Effects of wheat-stubble height and weed control on winter pheasant abundance. Wildlife Society Bulletin 30:1099-1112.

Abstract: Recent changes in agriculture on the semi-arid central High Plains have serious implications for pheasants (*Phasianus colchicus*) and other farmland wildlife. Of greatest concern are increased herbicide use accompanying intensification of crop rotations and the shorter wheat (*Triticum aestivum*)-stubble heights produced by a shift to semi-dwarf wheat varieties and increasingly powerful combines. From 1990-1995, I investigated the effect of stubble height and post-harvest weed control on subsequent winter abundance of pheasants in wheat stubble. Increasing wheat cutting height from a mean of 22 cm to 46 cm produced a nearly 9-fold average increase in indices of winter pheasant abundance in wheat-stubble test blocks where no post-harvest weed control was performed. Post-harvest weed growth was positively affected by wheat-stubble height, probably due to taller stubble's ability to better conserve limited moisture by reducing ground-level air movement. Herbicide application to stubble reduced indices of winter pheasant abundance by >80%, and tillage reduced those indices by >90%, compared to untreated fields. Herbicide application to wheat stubble and reduced stubble height are considered major causes of the long-term decline of pheasants on the central High Plains. This research and a companion agronomic study have shown that increased stubble height and post-harvest weed growth in wheat stubble are integral components of a modified wheat-fallow rotation that provides superior habitat quality, soil conservation benefits, and greater profitability than other wheat-fallow systems currently in use. The benefits of greater wheat-stubble height can also be applied in more intensive wheat-row-crop-fallow rotations.

Rodgers, R. D. 1999. Why haven't pheasant populations in western Kansas increased with CRP? Wildlife Society Bulletin 27:654-665.

Abstract: Ring-necked pheasant (*Phasianus colchicus*) populations in western Kansas declined an average of 65% from 1966-75 to 1986-95, particularly in the 1980s. Although 686,000 ha of Conservation Reserve Program (CRP) grasslands have been added to the western Kansas landscape since

1985, pheasant populations have not recovered. Summer observations suggested that CRP was used proportionally more by pheasant broods than indicated by its relative availability. Overwinter pheasant use of CRP (a habitat gained) averaged just 37% of that in weedy wheat stubble (a habitat being lost). Widespread deterioration of abundant wheat stubble habitats, largely from increased herbicide use, represents an overwhelming habitat loss in western Kansas for which CRP could not compensate. In addition, anticipated pheasant benefits from CRP were not fully realized due to inadequate plant diversity, poor stand maintenance, and large field size. The habitat value of established CRP can be enhanced by strip-disking fireguards around the margins of fields to facilitate occasional controlled burns, stimulate growth of broad-leaved annuals, and increase edge. Interseeding perennial legumes and other forbs into recently burned grass stands also can be effective. Interspersion of grass-legume strips on intensively farmed croplands through the continuous signup of CRP offers great potential to improve pheasant habitat.

Snyder, W. D. 1984. Ring-necked pheasant nesting ecology and wheat farming on the High Plains. *Journal of Wildlife Management* 48:878-888.

Abstract: Radio-marked ring-necked pheasant (*Phasianus colchicus*) hens were monitored throughout the 1979-81 nesting seasons to investigate the relationships of weather, vegetation, and land use to nest site selection and nesting success in a northeastern Colorado site dominated by biennially cropped winter wheat. Survival status was determined for 113 of 131 hens, 74 of which were monitored throughout the primary nesting season. The amount of precipitation accumulated in the soil during the biennial cropping cycle was the primary factor affecting the height-density quality of winter wheat and post-harvest stubble, which is the dominant nesting cover available in early spring. The number of early spring nests placed in different nesting cover was directly related to height-density quality of the vegetation. During springs when hens nested in stubble, mid-May to mid-June stubble field cultivation destroyed clutches and promoted late renesting in wheat fields. Many of these renests were abandoned or destroyed during July wheat harvest. Cultivation prior to commencement of incubation (Apr-early May) makes stubble fields unattractive to nesting hens and promotes early nesting in wheat fields thereby increasing annual nesting success.

Taylor, M. W., C. W. Wolfe, and W. L. Baxter. 1978. Land-use change and ring-necked pheasants in Nebraska. *Wildlife Society Bulletin* 6:226-230.

Abstract: Changes in land use and ring-necked pheasant (*Phasianus colchicus*) density were documented for a 41.4-km² (16 mi²) area in south-central Nebraska. Significant land-use changes included the loss of noncropland areas and a shift in crop types from pasture, hay, and small grains to row crops. Interspersion of cover types declined in conjunction with the observed land-use changes. The rate of most changes was higher from 1964 to 1976 than from 1955 to 1964.

Warner, R. E., and S. L. Etter. 1989. Hay cutting and the survival of pheasants: a long-term perspective. *Journal of Wildlife Management* 53:455-461.

Abstract: We documented the fates of 1,104 ring-necked pheasant (*Phasianus colchicus*) nests in harvested and unharvested hayfields near Sibley, Illinois, from 1962 to 1972. A mean of 13 and 35% of nests in harvested and unharvested hay, respectively, hatched. Mortality rates of females and embryos

were high when hay cutting coincided with the late stages of incubation. Dates when forage crops in the Midwest are harvested have gradually advanced since World War II, especially in the northern portions of the pheasant range where dairy and livestock production are prevalent. Over the past decade, the mean day of first cutting for alfalfa, the most widely planted hay cultivar in the Midwest, has been 3 June, about 10 days earlier than it was during the 1950's. Mortality rates for pheasant nests found after the first cutting of hay near Sibley, Illinois, were used with mean dates of the first hay cutting for Illinois to compute indices of female and nest destruction for 1951-58 and 1977-87. Indices of pheasant destruction were lower ($P < 0.01$) for 1977-87, which suggests that mortality of embryos and females during haying operations is, on average, easing in the Midwest due to earlier cutting. The presence of small tracts of nest cover near hayfields, if carefully managed, could enhance pheasant reproduction.

Warner, R. E., P. C. Mankin, L. M. David and S. L. Etter. 1999. Declining survival of ring-necked pheasant chicks in Illinois during the late 1900s. *Journal of Wildlife Management* 63:705-710.

Abstract: Previous studies indicated that survival of ring-necked pheasant (*Phasianus colchicus*) chicks during the first 6 weeks of life declined from the early 1950s through early 1980s in Illinois with the expansion of corn and soybean production and associated clean farming practices. From the early 1980s through mid-1990s, intensive row-crop production was moderated by farm programs such as the Conservation Reserve Program (CRP) and annual set-aside, which diverted millions of hectares of cropland from production. We evaluated the survival of pheasant chicks in Illinois in relation to these recent land-use practices. Specifically, our objectives were to determine if there were changes in chick survival during the 1980s and 1990s, and if there were regional differences in chick survival related to land-use practices. We observed 574 broods along transect road routes on the Sibley Study Area (SSA) in eastcentral Illinois, and 964 broods on routes throughout the pheasant range in Illinois. In spite of the increase in potential brood habitat on set-aside farmland, chick survival remained low from 1982 to 1996. For example, there was a 5-fold increase in the amount of forage legumes and small grains on the SSA from 1987-91 compared to 1975-81, with the average number of chicks per brood at 4.3 (1987-91) and 4.2 (1975-81). For survey routes throughout the Illinois pheasant range, the number of grassy fields (primarily narrow, linear tracts) in 1990 was positively correlated ($r^2 = 0.15$, $P < 0.02$, $n = 37$) with chicks per brood, but this relation explained only 15% of the variation. The lack of improvement in chick survival in recent decades relates to the pervasive clean farming practices in the Illinois pheasant range. Moreover, most of the set-aside land in the Illinois pheasant range was under annual contract and seeded late to monotypic oats, which is cover of marginal value to foraging pheasant chicks.