The National Wild Pheasant Conservation Plan

Key Literature:
Pheasant genetics and physiology

Last Updated: December 18, 2016

<u>Note:</u> 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.

Carroll, J. P. 1988. Egg-flotation to estimate incubation stage of ring-necked pheasants. Wildlife Society Bulletin 16:327-329.

<u>Abstract:</u> The ability to accurately estimate incubation stage and thus determine nest initiation and expected hatch dates of eggs is necessary in some types of research. The technique has not been fully evaluated in the field; therefore, I tested the reliability of Westerskov's (1950) egg-flotation technique to estimate incubation age of pheasant clutches. Actual day of incubation and those predicted from 20 first-time measurements were related ($r = 0.83$, 19 df, $P < 0.001$); the model accounted for 69.6% of the variability in predicting incubation age. Recalibration of Westerskov's (1950) categories may be necessary to reduce error in field estimates of incubation length. Desired precision of egg-flotation estimates also needs to be assessed before using this technique to age pheasant eggs. If precision greater than ±3 days is necessary, then the technique needs to be refined or some other method of aging eggs must be used.

English, P. F. 1941. Hatchability of pheasant eggs in relation to some known temperatures. Journal of Wildlife Management 5:213-215.

<u>Abstract:</u> From 1931 to 1933 the writer carried on a study of the Ring-necked Pheasant (*Phasianus colchicus torquatus*) on the Williamston Cooperative Game Management Project. In 1933 an attempt was made to determine what effect certain temperatures had upon fertile eggs. Hatchability varied only slightly in all ranges of temperature used. This indicated that under the conditions of the experiment temperature played a minor role in affecting the hatchability of pheasant eggs. Since the extremes of temperature to which the eggs in these experiments were exposed were as great as, or greater than, would normally occur in the wild prior to incubation, it appears that temperature is seldom an important cause of hatching failure. Three thunder-and-lightning storms occurred while the eggs were being incubated, but no deleterious effects upon the eggs could be determined. Eggs at the State Game Farm during this period were normal and comparable in hatchability to those of other years when there were no thunder storms during the hatching period

Hinkson, Jr., R. S., L. T. Smith and A. G. Kese. 1970. Calcium requirement of the breeding pheasant hen. Journal of Wildlife Management 34:160-165.

Abstract: Four isocaloric corn-soybean type diets containing 0.9, 1.8, 2.5, and 3.7 percent Ca were fed to young pheasant hens (*Phasianus colchicus*) during an 18-week experimental period. All the diets contained 26.0 percent protein and 0.6 percent available P. Each dietary treatment group was made up of 4 replicated pens containing one cock and 12 hens, except for one pen which contained 11 hens. The highest rate of egg production was obtained with pheasants fed a diet containing 2.5 percent calcium. The rate of egg production was significantly lower ($P < 0.05$) for the pheasants fed the diets containing 0.9 and 3.7 percent Ca. The greatest decline in the rate of egg production occurred with hens maintained on the diet containing 3.7 percent Ca. There were no significant differences ($P > 0.05$) in egg weight, eggshell-membrane thickness, or femur bone ash content with regard to the pheasant hens fed the four diets. Feed consumption was significantly lower ($P < 0.01$) for the hens consuming the diet containing 1.8 percent Ca. Hens in all treatment groups gained body weight during the experimental period. Egg fertility and hatchability results were variable within and between treatment groups.

MacMullan, R. A., and L. L. Eberhardt. 1953. Tolerance of incubating pheasant eggs to exposure. Journal of Wildlife Management 17:322-330.

Abstract: A series of experiments was devised in which eggs in various stages of incubation were exposed to lowered temperatures or simulated rainfall for varying periods of time. From the tolerance data thus obtained, an equation has been set up to approximate the relationship between temperature, stage of incubation, and length of exposure as affecting survival. The tolerance shown by pheasant eggs in these experiments was considerably greater than popularly supposed. For much of the incubation period, tolerance is great enough that widespread mortality from unseasonal cold spells would not likely occur in the wild. Newly-hatched chicks exposed to lowered temperatures are much more vulnerable than eggs in any stage of incubation.

Niewoonder, J. A., H. H. Prince, and D. R. Luukkonen. 1998. Survival and reproduction of female Sichuan, ring-necked, and F1 hybrid pheasants. Journal of Wildlife Management 62:933-938.

Abstract: Sichuan pheasants (*Phasianus colchicus strauchi*) were introduced in Michigan because it was believed they would exhibit higher survival rates than existing ring-necked pheasants (*P. c. torquatus*). We evaluated survival and reproduction of female Sichuan pheasants, ring-necked, and F, hybrid pheasants (*P c. strauchi* x *P. c. torquatus*) hatched and reared in captivity and released in southern Michigan. Spring-to-fall survival probabilities of hybrids (0.275) were greater ($P = 0.048$) than those of ring-necked (0.116) and Sichuan females (0.106). First nests of ring-necks had more eggs than first nests of both Sichuans and hybrids. Daily nest survival rates did not differ among pheasant types. Greater survival by hybrid females resulted in seasonal production of 2.45 chicks/female, which was greater than the 1.37 chicks/female for ring-necks and 0.83 chicks/ female for Sichuans ($P = 0.007$). While releases of pen-reared pheasants to establish or increase wild pheasant populations are often ineffective, use of pheasants with potential for diverse gene pools may increase chances of success.

Oates, D. W., G. I. Hoilien, and R. M. Lawler. 1985. Sex identification of field-dressed ring-necked pheasants. Wildlife Society Bulletin 13:64-67.

Abstract: Due to the number of birds found field dressed and without conventional evidence of sex, we initiated a study to evaluate sternal measurements for identifying sex of pheasants. A sternum calcification series was also prepared for young, growing pheasants, primarily to compare the sterna of juvenile roosters to those of an adult hen. Three sternal measurements were used to distinguish between the sexes. To facilitate field use of these data for legal records, a simple measuring device was constructed; this device included directions for use and specifically marked areas indicating range of overlap between sexes.

Purvis, J. R., A. E. Gabbert, M. L. Brown, and L. D. Flake. 1999. Estimation of ring-necked pheasant condition with total body electrical conductivity. Wildlife Society Bulletin 27:216-220.

Abstract: We used total body electrical conductivity (TOBEC) to estimate lean and lipid mass wild ring-necked pheasant hens (*Phasianus colchicus*) (*n* = 29) and compared the dictions to models based on morphologic measurements. TOBEC predicted lean mass at 99.5% (SD = 2.2%) of actual lean mass; predicted lipid mass was 106.8% (SD = 111.9%) of actual lipid mass. Hydration status and ingested foods were possible sources of experimental error. Though TOBEC was superior to morphologic measurements to estimate lipid mass, it may be too imprecise for field studies.

Warner, R. E., J. B. Koppelman, and D. P. Philipp. 1988. A biochemical genetic evaluation of ring-necked pheasants. Journal of Wildlife Management 52:108-112.

Abstract: Phenotypes of 41 enzyme loci were revealed by vertical starch gel electrophoresis for of pheasants (*Phasianus colchicus*): 8 groups from the established range in Illinois, 1 from traditional game farm stock, I from a first filial (F_1) cross of game farm x wild pheasants, and 1 from wild pheasants from southern Iowa (*n* = 9-20 birds/group). Allele frequencies at each locus, the mean number of alleles at each locus, the mean number of polymorphic loci, and indices of heterozygosity were calculated for each group. Genetic differences along a north-south cline for wild pheasants in Illinois were detected from principle coordinates analysis. Genetic analysis of North American pheasants is important for developing guidelines for preventing the loss of genetic variability in confined stocks, identifying characteristics that relate to fitness in the wild, and identifying where genetic mixing of stocks is appropriate.

Wollard, L. L., R. D. Sparrowe, and G. D. Chambers. 1977. Evaluation of a Korean pheasant introduction in Missouri. Journal of Wildlife Management 41:616-623.

Abstract: We evaluated the success of releases of 4,172 South Korean pheasants (*Phasianus colchicus karpowi*) in the Missouri River bottom in west-central Missouri by measuring dispersal, breeding effort, brood production, and survival during and after the 5 release years, 1967-71. Dispersal of tagged pheasants released at 2 sites in 1970 averaged 2.9 km; the farthest movement was 24 km. A winter survey in 1972 indicated that distribution of pheasants in the area approximated the annual dispersal limits. High initial mortality of released birds was suggested by recoveries of tagged birds released in 1970. Substantial numbers of broods reported by landowners in annual surveys, and moderate crowing

cock indices for 6 years following the last release indicate a reproducing population that is stabilizing at a low density. Lack of suitable nesting cover may be a factor limiting further growth of this population.