

# AVIAN PREDATION ON PHEASANTS WEARING DIFFERENTLY COLORED PLASTIC MARKERS<sup>1</sup>

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It was generally accepted for many years that diurnal birds experience color vision, but that they are blind to violet and blue. Hess (1912), sprinkled grain on a spectrum projected on a white floor and found that birds ate the grain from the red end of the spectrum up to the junction of the green and blue, but would not eat grain in the blue or violet. Honigman (1921), and others did not confirm Hess; they found chickens did eat grain stained blue and violet. Watson (1915) and Lashey (1916) learned that the chicken's spectral limits are 700 to 715  $m\mu$  at one end of the spectrum and 395 to 405  $m\mu$  at the other.

Walls (1942) believed that except for slightly more sensitivity to red, the chicken's spectral limits are similar to those of man, but the perception of blue and violet did not appear to be well established.

Welch (1946) found that House Sparrows (*Passer domesticus*) and blackbirds, Icteridae, would not eat green seeds given as poison bait to control rodents. Dennis (1951) found when working with nuthatches that green and blue seeds were the last eaten.

Kalmbach and Welch (1946), during a study of the effects of colored rodent bait as a means of safeguarding birds, set up feeding stations of green, yellow, and uncolored grain. No dead birds were found when green alone was used, only two with yellow, and 66 at the uncolored grain. The birds poisoned were 39 Brewer's Blackbirds (*Euphagus cyanocephalus*), 11 Redwinged Blackbirds (*Agelaius phoeniceus*), 2 Yellow-headed Blackbirds (*Xanthocephalus xanthocephalus*), 6 House Sparrows (*Passer domesticus*), 6 Magpies (*Pica pica hudsonia*), and 2 Mourning Doves (*Zenaidura macroura*). The authors concluded that food at the red-orange-yellow end of the spectrum is eaten first, while that at the blue is eaten last or not at all.

Color perception in birds may be influenced by the presence of oil droplets in the retina. These droplets are chiefly red, orange, and yellow in diurnal species, and pale or colorless in crepuscular or nocturnal species. Most authors agree that these droplets function in heightening the contrast of colored objects by holding back some of the glaring short waves of light and allowing more of the longer waves to stimulate the retina. The effect is that the red-orange-yellow colors are more vivid and the blues more dull and colorless. Species differ in the amount and distribution of colored droplets. Pigeons have yellow in the lower part of the retina. Kingfishers have red, and hawks have mainly yellow (Wallace, 1955).

## METHODS AND MATERIALS

The study took place during 1953-58 as part of pheasant production and ecological studies at the Olentangy Wildlife Experiment Station near Delaware, Ohio. During this study each pheasant released was marked with a double plastic marker (see Taber, 1949) of either red, white, yellow, or blue in color. This marker consisted of two pieces 1.5×3.5 inches which were linked to a pin attached to the back of the bird.

During the period of this study, predation by avian predators was very high. In an attempt to control predators, 19 Red-tailed Hawks (*Buteo jamaicensis*), 2 Red-shouldered Hawks (*Buteo lineatus*), 17 Great Horned Owls (*Bubo virginianus*),

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1 Barred Owl (*Strix varia*), and 3 Barn Owls (*Tyto alba pratincola*) were trapped in the area.

When a pheasant was found killed by an avian predator, the color of the plastic marker on the bird was recorded. It became immediately apparent that this study might yield important data on the color vision of the avian predators of this area.

During any given year of the study an equal number of pheasants bearing each of the marker colors was released, and since the only color difference among the pheasants was between the sexes, it is felt that the number killed bearing each color is indication of the predator's ability to see them.

Table 1 shows the number of pheasants killed by avian predators during each year of the study.

TABLE 1  
*A record of avian predation*

Year	Total pheasant population	Number killed	Number killed bearing each color marker			
			Red	White	Yellow	Blue
1953	400	89	29	14	35	11
1955	80	19	3	5	7	4
1956	112	16	4	5	6	1
1957	92	10	3	3	2	2
1958	44	7	0	1	4	2
Total	728	141	39	28	54	20

#### CONCLUSIONS

During the period of the study, between 1953-58, except for 1957, more pheasants bearing yellow markers were killed by avian predators than those bearing any other color.

When pheasants killed by avian predators during all years of the study were considered collectively, 39 pheasants bearing red, 28 bearing white, 54 bearing yellow, and 20 bearing blue markers were killed. It is probable that these different rates of avial predation on the pheasants were due to the predators' ability to see the colors and find the pheasants.

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