COLORED GRAIN SELECTION BY SIX PEN-RAISED PHEASANTS

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Recent studies on the effect of color, as a factor in the selection or repellance of birds, have been somewhat inconclusive or contradictory. Kalmbach (1943) used colored grains as a basis for determining the level of "non-acceptance" by quail and "acceptance" by rodents in an effort to establish criteria for the dyeing of poisoned baits. Later Dambach and Leedy (1948, 1949) experimented with colored grains as a means of repelling pheasants, in an effort to reduce "pulling" of corn.

Kalmbach's studies can hardly be said to be entirely conclusive, since the cereals employed are not generally regarded as normal diet for the birds under observation. Furthermore, acceptance of colored grains "beyond the color-perception range for the avian eye" could be justified on the basis of simple conditioning. While this may be a factor, the writer does not hold this explanation to be altogether satisfactory, since we do not know the absolute range of color perception in the birds, despite the fact that visual acuity in birds is known to be high.

Dambach and Leedy were unsuccessful in establishing a wholly satisfactory repellant in the case of pheasants. While several methods were employed, neither colored grains nor those with noxious odors were completely successful in repelling or greatly reducing losses by pheasant "pulling" of sprouted corn and corn seedlings.

Seven vegetable dyes were used to treat the grain (corn) used in this investigation, and in addition, normal, untreated corn was used. Six adult pheasants (3 males and 3 females) were employed during the course of the test periods. The birds were kept in a small greenhouse which provided roosting facilities, and at the same time afforded adequate room in which to move about. In addition, there was considerable dry soil available for "dusting" and scratching. It would appear that some grit was also available.

Three dishes of grain (whole corn kernels) were placed on the ground, and the position of these dishes changed daily so that on no two consecutive days were any combinations of colors in exactly the same position. On the second day of the test, a wooden "flat", commonly used in starting plants, was used as a correlary to the main tests. Bowls "A" and "B" were replenished daily to provide 100 kernels each of four different colors of corn for consumption. The volume of corn in bowl "C" was approximately equivalent to that of corn in either bowl "A" or bowl "B"; the volume of untreated corn in bowl "C" was checked daily, and the amount of corn used by the birds replaced. The actual number of kernels of corn was not counted for bowl "C", but measurement by volume was made each day. The wooden tray, which contained 10 grains of normal (untreated) corn and 10 grains of each of the seven colored (treated) corn kernels, was also checked and the consumed kernels replaced daily.

The results of these tests, noting the *daily*, *period total*, and *average daily* consumption of the various colored grains in each bowl, are in table 1.

OBSERVATIONS

In table 1, the data collected during the two testing periods (Feb. 17-Feb. 25 and Mar. 2-Mar. 6, 1949) are arranged to show the daily consumption of untreated and dyed corn, in grains per day for six pheasants.

TABLE 1

Daily consumption of untreated and dyed corn, grains per six pheasants, February 17 to 25 inclusive, and March 2 to 6 inclusive.

Treatment	NUMBER OF DAYS OF TEST (2/17–2/25, 1949)											(3/2–3/6, 1949)						
	1	2	3	4	5	6	7	8	9	Total	Average	1	2	3	4	5	Total	Average
BOWL A:																		
Tartrazine Yellow	27	11	99	90	31	94	96	84	95	627	69.7	92	90	53	45	100	380	76.0
Amaranth Red	31	0	75	7	5	5	17	8	26	174	19.3	17	22	2	1	19	61	10.3
Brilliant Blue	32	0	4	5	10	60	37	16	78	242	26.9	26	53	13	30	55	177	35.4
Nigrosine	30	0	4	6	4	35	24	9	6	118	13.1	17	56	28	30	100	231	46.2
Total	120	11	182	108	50	194	174	117	205	1161	129.	152	221	96	106	274	849	169.8
BOWL B:																		
Untreated	25	99	100	91	28	35	66	41	30	515	57.2	83	37	86	70	42	318	63.6
Sunset Yellow	13	6	45	37	15	4	59	18	13	210	23.3	44	2	32	10	3	91	18.2
Erythrosine	7	4	38	6	6	3	31	25	24	144	16.0	38	3	57	22	37	157	31.4
Guinea Green	8	8	6	11	90	18	44	15	26	226	25.1	26	0	25	1	4	56	11.2
Total	53	117	189	135	139	60	200	99	93	1085	121.6	191	42	200	103	86	622	124.4
BOWL C:																		
Untreated	100%	100%	100%	100%	80%	100%	40%	95%	100%	.....	90.5%	25%	100%	50%	40%	40%	.....	51.0%
WOODEN FLAT:																		
Untreated	.....	10	10	10	10	10	9	9	10	78	.....	10	10	10	10	10	50	.....
Tartrazine Yellow	.....	9	10	10	10	10	10	10	10	79	.....	10	10	10	10	10	50	.....
Sunset Red	.....	3	8	10	10	10	10	10	10	71	.....	10	10	9	10	10	49	.....
Erythrosine	.....	1	5	10	10	10	2	10	10	58	.....	10	10	10	10	10	50	.....
Amaranth Red	.....	2	8	10	10	10	10	8	9	67	.....	10	7	10	10	10	47	.....
Guinea Green	.....	3	5	10	10	10	10	9	9	66	.....	10	10	9	10	10	49	.....
Brilliant Blue	.....	4	7	10	10	10	10	10	10	71	.....	10	10	10	10	10	50	.....
Nigrosine	.....	0	1	10	10	10	10	4	9	54	.....	10	10	9	9	10	48	.....
Total	.....	32	54	80	80	80	71	70	77	544	.....	80	77	77	79	80	393	.....

At the end of nine days, four days of feeding only normal, untreated corn followed, before returning to the use of colored corn for a period of five days.

Table 2 summarizes the corn consumption in bowls "A", "B", and "C" for both the nine day and five day periods, with respect to high and low corn consumption, and average daily consumption. The average daily consumption can be read as either numbers of kernels of corn consumed or as percentage of kernels of corn consumed (number consumed: number available).

DISCUSSION AND CONCLUSIONS

It will be noted from the above observations that there may have been some learning during the first testing period, since there was an average increase of 7.74 grains of colored grains taken per day during the second testing period (above the average daily consumption in the first period.)

Assuming that some learning did occur during the first period, it would appear to be with respect to "general acceptance" of colored grains, rather than with

TABLE 2

Daily corn consumption for six pheasants, with respect to high and low consumption.

	9 DAY PERIOD			5 DAY PERIOD		
	High	Low	Average	High	Low	Average
Amaranth Red	75	0	19.3	22	1	10.3
Erythrosine	38	3	16.0	57	3	31.4
Sunset Yellow	59	4	23.3	44	2	18.2
Tartrazine Yellow	99	11	69.7	100	45	76.0
Normal Green	100	25	57.2	86	37	63.6
Guinea Green	90	6	25.1	26	0	11.2
Brilliant Blue	78	0	26.9	55	13	35.4
Nigrosine	35	0	13.1	100	17	46.2
Bowl "C:" Untreated	100%	40%	90.5%	100%	25%	51.0%

Average daily use of treated (dyed) and untreated corn (bowls "A" and "B" only):

	Per 6 birds	Per bird
For 9 day period	249.55	41.59
For 5 day period	294.20	49.33

respect to "special acceptance" or of any particular color selection. The only notable selection of colored grain was evidenced by an apparent preference for corn dyed with the Tartrazine Yellow, this even over normal, untreated corn. In both periods of the test, the preference appears to have been of about the same level or threshold of acceptance. During the second period, however, a greater amount of both Tartrazine Yellow dyed and untreated corn was used than during the first period of the test.

Perhaps the most outstanding feature of the two testing periods lies in the wide differences of acceptance of colored grains during the two periods, and from day to day.

It may be concluded that artificially colored grains of corn may be eaten in varying quantities by pheasants, and that the amount eaten varies from day to day, and furthermore, there is daily variation in the proportions of different colors which are consumed. It may be inferred that while "preference" appears to be exhibited by these birds, the range of colors of "special preference" lies within a

very narrow range of the color spectrum, other colored foods may be eaten and without seeming "preference" or respect to any particular color or color influence.

Finally, it would appear from this and other studies, that colored baits can not be used as a repellant or effective deterrant for birds, and this may apply most particularly to most of the gallinaceous birds. At the same time, it may be concluded that any attempt to reduce "pulling" of corn by coloring the seed is virtually useless as a real deterrant.

Some colors may serve to camouflage poisonous baits and thus reduce their consumption by some birds, but the color can hardly be interpreted as being a primary repellant factor.

It would appear that further studies on repellants for use against birds, and especially against gallinaceous birds, should follow an entirely different course of investigation, since color does not appear to be an important or effective repellant or deterrant.

The chief importance in coloring of poisoned baits may be applied to the handling by human-beings, at least to some extent, although this is not always entirely successful.

ACKNOWLEDGMENTS

The writer wishes to express his gratitude to Dr. Charles A. Dambach, Dr. Daniel L. Leedy, Dr. Loren Putnam, Dr. Eugene H. Dustman, and Dr. Lloyd G. Webb for their several suggestions during the course of this investigation.

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