FEEDING FISH MEAL TO DUCKLINGS

By Hugo W. Nilson*

Considerable concern has been expressed by stock and poultry raisers that feeding fish meal would result in fishy or other off flavors in the meat of farm animals. Lanham and Nilson (1946) and Nilson and Schayer (1946) reported that feeding rations containing about 25 percent fish meal did not adversely affect the flavor of the flesh of 6-week old chicks or 8-month old pullets. Bryant and Stevenson (1939) and others, however, have reported a fishy flavor in the meat of turkeys which had been fed fish meal. Apparently, the various species of domestic fowl may react differently in this respect.

It was, therefore, considered desirable to feed ducklings with rations containing a high level of a good grade of commercial fish meal in order to note any effects on the flavor of the flesh. In order to make the experiments more critical, several groups were also fed meals which had been experimentally spoiled under conditions of high heat and humidity (Lanham and Nilson, 1942). These meals had a very foul odor.

EXPERIMENTAL METHODS AND DATA: On July 6, 1942, 15 newly hatched Indian Runner ducklings were purchased from a hatchery. These were allotted into four groups and housed in battery cages with an environmental temperature of 80° F., and with brooding facilities in each cage. The ducklings had dry feed and water before them at all times. They were weighed, individually, once weekly, and the feed intake by groups was also recorded each week. The latter data are only approximate, since there was considerable wastage of feed in the water troughs.

The basic ration, in parts by weight, was composed of the following:

Alfalfa meal	- 2.5	Ground yellow corn	- 68	Salt (containing enough manganese for 100 parts per million of ration)	- 0.5
Cod liver oil	- 1.0	Pilchard meal	- 25		
Dried brewer's yeast	- 1.0	Soybean oil	- 1.0		
		Wheat germ	- 1.0		

One group received all commercial meal, one 80 percent commercial and 20 percent experimentally spoiled meal, and another only the experimentally spoiled meal. The remaining group was fed a control mash in which the fish meal and 10 parts of corn meal were replaced by 30 parts of meat meal and 5 parts of dried skim milk. The fish meals contained about 70 percent protein.

Two of 4 ducklings fed the meat meal-skim milk ration suffered from perosis. One duckling grew so poorly that the data are not included in the summary. It weighed only 430 grams after 5 weeks as compared with an average of 971 grams for the other members of the group, and was completely helpless. It was offered the

*Chemist, Fishery Technological Laboratory, College Park, Md.

ration containing both commercial and spoiled meal, but evidently ate very little feed. This duckling made an uneventful recovery when allowed to feed on pasture and was still alive early in 1946.

The data in Table 1 show that all of the groups fed fish meal had a heavier mean liveweight than the group fed meat meal and skim milk. In fact, only 2 of 10 ducklings fed fish meal weighed less than the heaviest 1 in the group fed meat meal and skim milk. One of these belonged to the group fed the experimentally spoiled meal and weighed only 908 grams as compared with 1215, 1237, and 1256 grams for the others. Except for this duckling, the group fed spoiled fish meal would have had the best record. The number of ducklings used was small, so the differences in gain in liveweight were not statistically significant.

Table 1 - Gain in Weight of Ducklings Fed Rations Containing Commercial and Experimentally Spoiled Pilchard Meal for a 6-week Period

Ration Designation	Number of ducklings	Average Liveweight		Daily gain in weight	Coefficient of variation	Food per gram gain in weight
		Initial	Final			
Indian Runners:		Grams	Grams	Grams	Percent	Grams
Commercial	3	39	1192	2.75	17	2.45
80 percent commercial, and 20 percent spoiled	3	36	1214	2.81	12	2.41
Spoiled	4	40	1154	2.64	16	2.81
Meat meal, and dried skim milk	4	39	885	2.02	19	2.98
Pekings:						
Commercial	4	65	1212	2.73	14	3.23

At the close of the experiment, the ducklings were killed and dressed. They were distributed to various staff members for cooking and taste testing. No fishy or other off flavor in the flesh was reported.

On July 5, 1945, 4 1-day-old Peking ducks were obtained from a hatchery. These were kept as a group under the environmental conditions mentioned previously. The ration fed, in parts by weight (Titus, Hammond, and Whitson, 1943) consisted of:

Commercial pilchard meal	- 4.5	Soybean oil meal	- 12.1	Ground oyster shells	- 1.0
Ground yellow corn meal	- 54.5	Cottonseed meal	- 5.0	Steamed bone meal	- 0.9
Ground oats, or wheat middlings	- 10.0	Alfalfa meal	- 8.0	Salt plus a little manganese	- 0.9
		Dried distiller's solubles	- 3.0	Cod liver oil	- 0.1

This wartime formula was used to determine the nutritive value of certain fish meals for chicks, and the experiment with ducklings was more or less incidental. The objects of the experiment were to determine the growth of ducklings fed a ration in which a fairly low level of fish meal supplied the only animal protein; to determine the effect of the ration on the flavor of the meat; and to determine if feeding a wet mash was preferable to feeding a dry mash, as was used in the previously reported experiment. Dry feed was weighed out twice daily in a trough and mixed with enough water to make a fairly thick paste. From the experimental feeding standpoint, this method was more satisfactory than offering dry feed, but there was still considerable wastage, since the ducklings insisted on mouthing food in the water trough before swallowing.

The data in Table 1 show that these ducklings grew nearly as well as those fed the rations containing much more fish meal. Taste tests indicated no fishy or other off flavors in the meat, although the dressed ducks were quick frozen and kept in storage for 4 months.

The conclusion reached was that rations containing a high level of fish meal do not produce fishy or other off flavors in the flesh of 6-week old battery fed ducklings.

LITERATURE CITED

BRYANT, REECE L., and STEVENSON, GLADYS T.

1939. Fishy flavor in turkey meat caused by feeding menhaden fish meal. Vir. Agr. Exp. Sta. Bull. 321.

LANHAM, WILLIAM B. JR., and NILSON, HUGO W.

1942. The effect of heat and moisture on the feeding value of pilchard meal. U. S. Fish and Wildlife Service, Research Report 3.

1946. Some studies on the feeding value of fish meals. Manuscript submitted for publication. United States Department of the Interior.

NILSON, HUGO W., and SCHAYER, RICHARD W.

1946. Some studies on feeding fish meals to pullets. Manuscript submitted for publication. United States Department of the Interior.

TITUS, HARRY W.; HAMMOND, JOHN C.; and WHITSON, DONALD

1943. Wartime feed mixtures for chickens. U. S. Department of Agriculture Circ. AWI-48 pp-6.