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L. George
St. Mary's College

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BROTHER L. GEORGE, F.S.C.
St. Mary's College

The trout waters of Minnesota are divided into two groups, namely, the north shore streams which empty into Lake Superior, and the southeastern streams which enter into the Mississippi River. The latter group consists of the Whitewater and Root River systems along with many small streams between them. Gilmore Valley Creek is one of these smaller streams located in a narrow valley typical of this region.

The present report will consist of a series of stomach analyses made of trout secured in Gilmore Valley Creek during the fishing seasons of 1945 and 1946. In May, 1945, data were secured on only six trout. Four of the specimens were larger trout measuring 12 inches or more and weighing 12 ounces or over. The stomachs of three of these large trout had one or more minnows in them. Some snails were also found. No analysis was made of the insects. Four earthworms and a large Tipula (crane fly) larva were found in one of the two smaller trout. The other small trout had a total of 34 insect larvae which included: 13 Tricoptera (caddis-fly), 12 Chironomidae (midge), 8 Baetis (may-fly), 1 Tipulidae (crane fly). From the above few samples it seems that the larger trout use the minnow population principally as their source of food, while the smaller trout confine themselves mostly to immature insects.

In 1946 a more thorough study was made of trout stomachs. All the fish were identified to species, and their length, weight, and age determined. The Minnesota Conservation Department had clipped the two dorsal fins of all the yearling brown trout put into the stream in April 1946, and thus simplified the determination of age. During May, fifteen specimens were studied. Nine of them were yearling brown trout introduced into the stream during the previous month. They averaged 8¼ inches in length and 3 ounces in weight. Their stomach analyses yielded the following totals: 441 Chironomidae larvae (midge) in 3 specimens, 375 Chironomidae pupae (midge) in 4 specimens, 4 Lumbricus (earthworm) in 4 specimens, 5 Gammarus (scuds) in 1 specimen, 2 Corixidae (water boatman) in 2 specimens, 1 Trichoptera larva (caddis-fly) in 1 specimen, 1 Gerridae (water strider) in 1 specimen, 1 Tipulidae larva (crane fly) in 1 specimen, 1 Trichoptera pupa (caddis-fly) in 1 specimen, 1 Baetis nymph (May-fly) in 1 specimen.

From these findings it is seen that the midge larvae and pupae as well as the earthworm were found most consistently. All of these trout foods are confined to pools. Here the midge larvae lie in the sandy or alga-covered bottoms, while the pupae are in the process

of emerging. The earthworms are tumbling along the bottom as the current propels them slowly down the stream.

Three of the other six trout studied in May were brook trout which averaged close to 9¼ inches in length and 4 ounces in weight. The results of their stomach analyses are as follows: 400 Chironomidae pupae (midge) in 2 specimens, 29 Chironomidae larvae (midge) in 2 specimens, 3 Tricoptera (caddis-fly) in 1 specimen, 1 Dytiscidae (diving beetle) in 1 specimen, 7 Gammarus (scud) in 1 specimen, 2 Elmis (riffle beetle) in 1 specimen, 1 Haliplidae (crawling water beetle) in 1 specimen. The findings here indicate that the midge is again the favorite of the trout in May. It should be noted that these brook trout were larger than the clipped brown trout and at least two years old. However, a certain preference for beetles and scuds may possibly be noted.

Of the remaining three trout whose stomach contents were analyzed in May, all were unclipped brown trout. One of these measured only 7 inches and weighed but 1½ ounces. This undoubtedly was a yearling reared naturally in the stream. Its diet seemed to be similar to that of the hatchery-raised yearlings. The stomach contents included: 63 Chironomidae pupae (midge), 1 Chironomidae larva (midge), 1 Lumbricus (earthworm), 3 Gerridae (water strider).

One of the remaining two specimens measured 15½ inches in length and weighed 18 ounces. It had but two dytiscid beetles in its stomach. Of all the stomachs analyzed, the stomach of this individual produced the least number of specimens, even though it was the largest trout studied. The other specimen measured 9½ inches in length and weighed 5 ounces. Its stomach contained: 54 Elmis (riffle beetle), 5 Hydrophilidae (water scavenger beetle), 3 Corixidae (water boatman).

The only significant feature about these older brown trout specimens was the absence of minnows in their diet as compared with those studied the year before. However, the insufficient number of fish studied permits only tentative conclusions.

The five specimens studied during August, 1946, were secured through the cooperation of the Bureau of Fisheries Research of the Minnesota Conservation Department, who were making a study of the fish population of this stream. Shocking equipment was used. Two live electrodes were placed in the water. Any fish coming close to or between the electrodes was immediately but temporarily inactivated. This allowed time to catch the fish as they floated downstream. Measurements were made and the specimens returned to the stream by the time the fish had recovered. The five specimens used in the stomach analyses were those which did not fare so well with the shocking experience.

One of these specimens was a clipped brown trout measuring 8¼ inches and weighing 4 ounces. Its stomach yielded: 10 Physa

(snail), 2 Chironomidae pupae (midge), 2 Corixidae (water boatman).

The other four specimens were fingerling brown trout naturally reared in the stream the previous autumn. They were found mostly in a long pool near the headwaters of the stream. They averaged 3⅝ inches in length and ½ ounce in weight. Their stomachs contained: 210 Baetis nymphs (May-fly) in 4 specimens, 21 Simuliidae larvae (black fly) in 1 specimen, 5 Chironomidae larvae (midge) in 3 specimens, 2 Chironomidae pupae (midge) in 1 specimen, 2 Tipulidae larvae (crane fly) in 1 specimen, 2 Physa (snail) in 1 specimen, 1 Dytiscidae adult (diving beetle) in 1 specimen. The outstanding factor here was the abundance of May-fly nymphs and black fly larvae which had been practically absent from all previously studied stomach contents. Both of these insects are riffle dwellers. Several explanations can be given for this variation in trout diet. First, the May-fly nymphs are quite abundant at this time of the season and the trout naturally adapt their diet to the food available. Second, the fingerling trout may prefer a different diet to the larger ones.

In conclusion it may be said that all the stomach contents analyzed had some food in them. In fact, most of the trout had an abundance of specimens. Of the 20 stomachs examined in 1946, a grand total of 1622 specimens were identified. This gives an average of 81 specimens per trout stomach. Therefore it was not surprising to find that the ratio of length and weight of the trout found in Gilmore Valley Creek compared favorably with the standard.

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THE ORIGIN OF CERTAIN TUMORS IN DROSOPHILA

MARY B. STARK
Hamline University

ABSTRACT

This report concerns two tumors: one a lethal, occurring in one-half of the males and killing same; another, appearing in both males and females and always benign.

The sex-linked tumor, occurring at any time during the larval life, always interfering with further metamorphosis and eventually killing the larva, is derived from groups of tiny embryonic cells, destined to form some internal organ of the adult stage. Those of the digestive tract are located just outside of the epithelium and have been found to enlarge by rapid proliferation of their cells and to break away from their original positions, developing into tumors one-fourth as large as the larva itself.

The benign tumor which is due to genes located in the second, third, and possibly the fourth chromosomes is therefore not sex-