

INTRODUCTION OF TROPICAL FISHES INTO A HOTSPRING NEAR BANFF, ALBERTA

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IN 1924 mosquitofish, *Gambusia affinis* (Baird and Girard), were introduced for purposes of mosquito control into the outflow of Cave and Basin Hotspring, Banff National Park, Alberta. In the summer of 1953 these waters were checked and the presence of numerous schools was confirmed (Mail, 1954).

In response to my request, Drs. A. H. Clarke and E. G. Munroe checked on the status of this population while visiting the Banff area on 1 June 1968. Using dip nets, specimens were collected from a marsh (see Figure 1) which is located immediately below and is partly warmed by several outlets of the hotspring, near the Bow River. To our surprise not only *Gambusia affinis*, but the green swordtail, *Xiphophorus helleri* Heckel, and the guppy, *Poecilia (Lebistes) reticulata* Peters, were collected. Most were preserved (see table 1) but 7 living guppies were brought back (still alive, 15 October 1968). Enquiry revealed that local aquarists had planted tropical fishes and that mollies, cichlids and angelfish were also present. Except for the angelfishes, the fishes were reported to overwinter. It appears that introductions of species other than the mosquitofish must have been made between 1958 and 1967.

At the author's request the Regional Biologist, Mr. J. C. Ward, contacted through Mr. Jean-Paul Cuerrier, made a further collection in the same locality 28 August 1968, in the hopes of securing the other species reported. This collection contained the previously caught species and in addition the all-black variety of the sailfin molly, *Poecilia (Poecilia) latipinna* (Lesueur) (previously placed in the genus *Mollienesia*) and the convict or zebra cichlid, *Cichlasoma nigrofasciatum* (Günther). Fishes from this collection are shown in Figure 2. None of these species are recorded in Scott and Crossman's (1967) *Provisional checklist of Canadian freshwater fishes*. The only other references to the mosquitofish in Canada are a brief mention in Nelson (1965) to the hotspring introduction and ones in Carl, Clemens and Lindsey (1967) and Smith (1960) which will be mentioned further on. The specimens of the sailfin molly, the guppy, the green swordtail and the zebra cichlid apparently provide the first records for their successful introduction into the waters of Alberta and of Canada.

The number and size ranges of each species in the two collections are recorded in Table 1, with the total number of specimens collected and the total size range. The collections, except for a small sample of each species sent to the Royal Ontario Museum, are catalogued in the National Museum of Natural Sciences, National Museums of Canada, Ottawa. Nomenclature of poeciliids follows Rosen and Bailey (1963). From the table it is apparent that the guppy was most common in the collections, followed by the mosquitofish, the sailfin molly, the green swordtail and the zebra cichlid. The size ranges might suggest

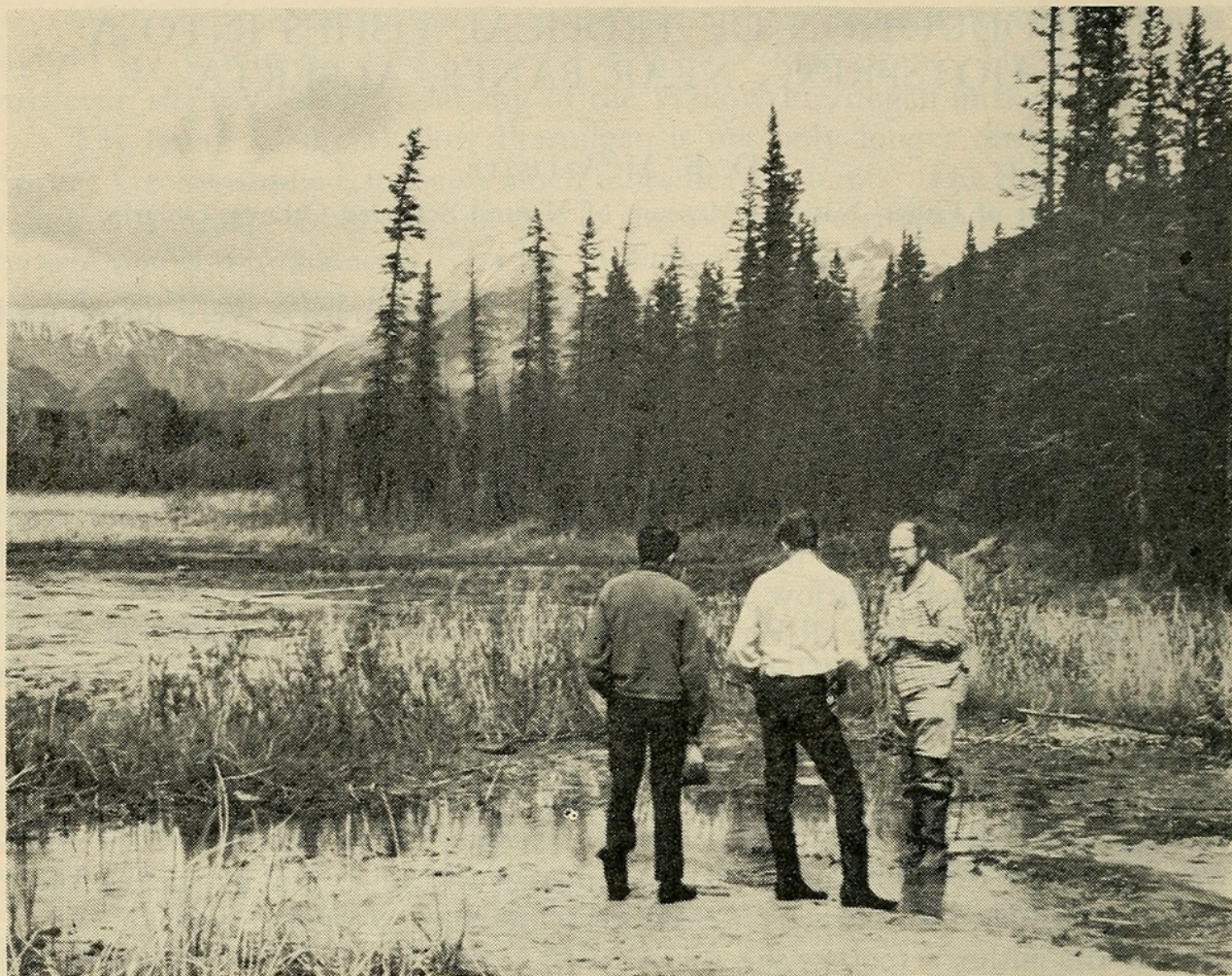


FIGURE 1. Photograph of the location in the marsh where collection NMC 68-163 was made. Photo by Dr. E. G. Munroe.

that all species collected were reproducing, assuming no introductions of small fishes were made during the summer.

The collection site was in the marsh next to the outflow of Cave and Basin Hotspring at $51^{\circ}10'N$, $115^{\circ}35'W$, across the road from the spring itself, about one mile southwest of Banff on the southwest side of Bow River, Banff National Park, Alberta. According to Dr. Clarke the water is $30^{\circ}C$ where it exits from the outlet pipe, but $26^{\circ}C$ in the swamp where the fish are found. Vegetation is present on a muddy bottom. The current is slight, the water depth 0-8 inches.

In addition, three other introductions of mosquitofish *Gambusia affinis*, into Canadian waters, may be noted. D. L. Smith (1960) records that in May 1958, 50 mosquitofish were released into a pond near the University of Manitoba, Winnipeg, Manitoba. By October there were 3,000, of which 1,000 were removed. In late May of 1959, after the ice had melted it was found that a good population had overwintered and had begun to reproduce. Dr. C. C. Lindsey (*in litt.*, November 15, 1967) wrote me that, according to Dr. Thorstein, Head of the Department of Entomology, these mosquitofish survived for about two winters but in 1961 or thereabouts the pond ("in a private yard near the

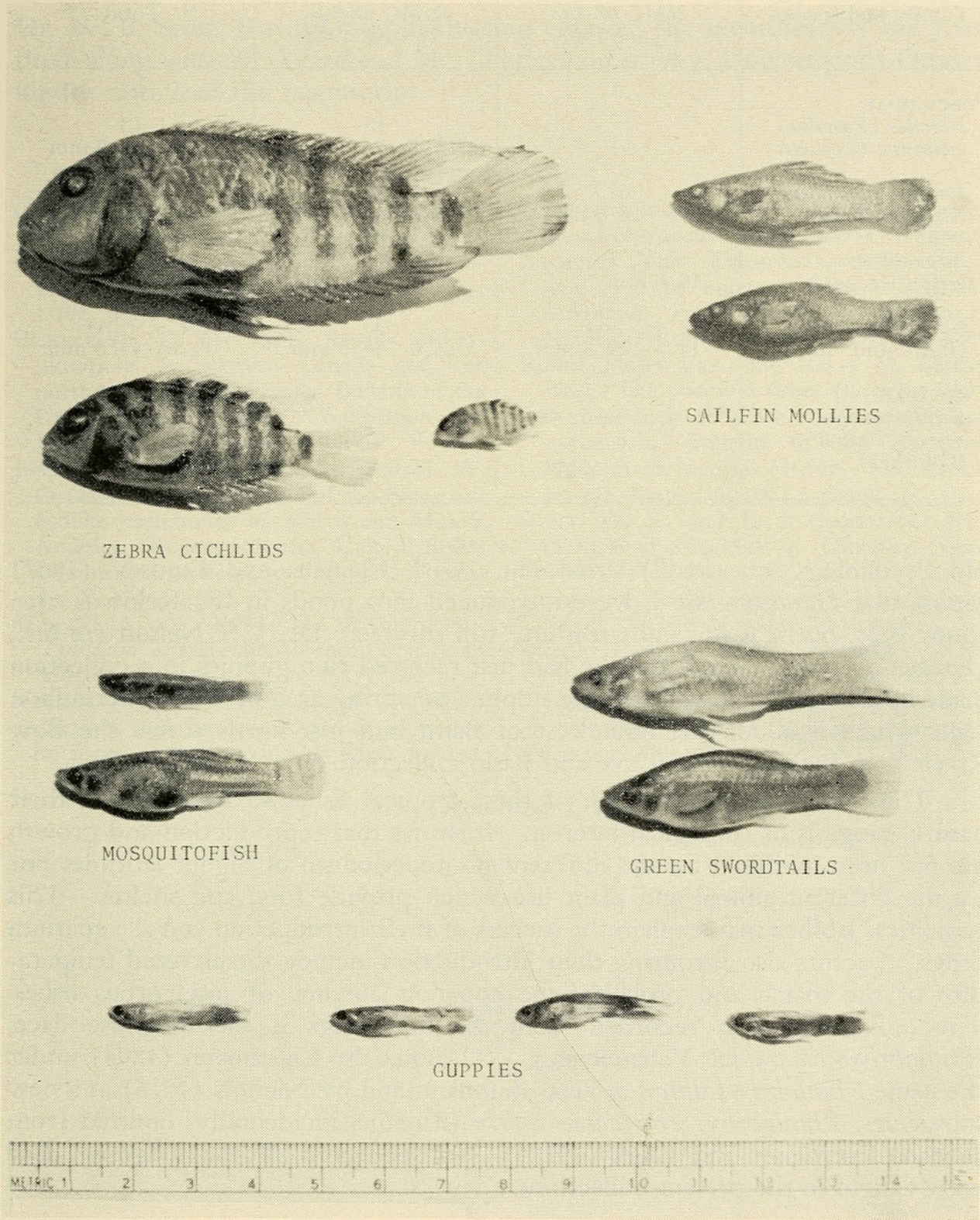


FIGURE 2. Photograph of fishes in collection NMC 68-301 taken from the outlet of the Cave and Basin Hotspring, Banff National Park, Alberta.

TABLE 1. — Number and size range (mm standard length) of fishes in hotspring collections

Family and species	Collection NMC 68-163 1 June 1968	Collection NMC 68-301 28 Aug. 1968	Total
POECILIIDAE			
<i>Poecilia (Poecilia)</i> <i>latipinna</i> (Lesueur)	—	13 18.4–35.9 mm	13 18.4–35.9 mm
<i>Poecilia (Lebistes)</i> <i>reticulata</i> Peters	62 7.8–18.5 mm	396 6.4–29.2 mm	458 6.4–29.2 mm
<i>Xiphophorus</i> <i>helleri</i> Heckel	1 19.0 mm	11 20.4–38.2 mm	12 19.0–38.2 mm
<i>Gambusia affinis</i> (Baird and Girard)	12 + 7 live 14.4–29.2 mm	95 11.0–44.8 mm	107 + 7 live 11.0–44.8 mm
CICHLIDAE			
<i>Cichlasoma</i> <i>nigrofasciatum</i> (Günther)	—	4 15.9–67.6 mm	4 15.9–67.6 mm

old Psychology rat shed") dried out. Carl, Clemens and Lindsey (1967) report that *Gambusia* sp. ? were introduced into ponds in the Kelowna area about 1928, but it is not known if any still survive. Dr. J. S. Nelson (*in litt.*, October 21, 1968) wrote that he had just received two guppies in a collection made by Mr. J. C. Ward from the sulphur hotspring area of Third Vermillion Lake which is about one mile west of Banff and just north across the Bow River from the site of the Cave and Basin collection.

The successful introduction of these tropical fishes so far north of their natural range is of ecological interest. It shows that reproduction and growth has not been inhibited by the different photoperiodism of higher latitudes nor by the different animal and plant life which provide food and shelter. This ecological lability may explain the success of their introduction and as aquarium fishes. Factors also favouring their introduction include the elevated temperature of the marsh and probably the apparent absence of piscivorous fishes. The only other fish recorded from the hotsprings is the longnose dace, *Rhinichthys cataractae* Valenciennes, 1842, noted by Eigenmann (1894) under the name *Rhinichthys dulcis* as very abundant, and by Nichols (1916) as a new subspecies, *Rhinichthys cataractae smithi* (a name, incidentally, omitted from Jordan, Evermann and Clark, 1930). No specimens of the longnose dace were caught in the present collections.

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