CONTRIBUTIONS TO THE ZOOLOGY OF THE BERING SEA CIID (CIRROCEPHALUS LACERTUS) IN ALASKA
Contributions to the Biology of the Bering Cisco (Coregonus laurettae) in Alaska

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Taxonomic and biological data are presented on Bering cisco, Coregonus laurettae Bean, from the South Fork of the Kuskokwim River; Hess Creek and the Porcupine River in the Yukon System; and the Koyuk River and Port Clarence-Grantley Harbor area of western Alaska. Gill raker counts ranged from 31-40 with means of 33.8-36.6, those on the lower arch 18-24 with means of 20.4-23.6. Potential spawners were found 1610 km up the Yukon River in mid-June and 262 were taken at the mouth of Hess Creek in the Yukon River 1270 km upstream from the mouth June 10-14, 1972.

Bering cisco from Hess Creek grow faster than cisco from Port Clarence-Grantley Harbor, reaching a maximum length of 480 mm and 8 years of age. Growth rates for males and females are similar.


The author presents data on the taxonomic and biological studies of the Bering cisco, Coregonus laurettae Bean, in the Yukon System; and the Koyuk River and Port Clarence-Grantley Harbor area of western Alaska. Gill raker counts were made from 31-40 with means of 33.8-36.6, those on the lower arch 18-24 with means of 20.4-23.6. Des géniteurs en puissance ont été trouvés à 1610 km en amont dans le fleuve Yukon à mi-juin, et 262 ont été capturés à l'embouchure du ruisseau Hess dans le fleuve Yukon à 1270 km en amont de l'embouchure de ce dernier les 10-14 juin 1972.

Le cisco de l'Alaska du ruisseau Hess croît plus rapidement que celui de Port Clarence-Grantley Harbor et atteint une longueur de 480 mm et un âge de 8 ans. Mâles et femelles croissent au même rythme.

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This note presents the first biological data on the Bering cisco, Coregonus laurettae Bean. It had always been combined with the Arctic cisco, C. autumnalis, until McPhail (1966) established C. laurettae as a valid species. It is distributed from the Gulf of Alaska to Olikok near the Colville River and probably also in the Chukotsk and Kamchatka regions of Siberia (McPhail and Lindsey, 1970).

At present, it is little utilized with the exception of small numbers taken for subsistence use by gillnet and fishwheel.

Materials and methods — Bering cisco were taken in the course of inconnu, Sternotus leucichthys, and whitefish, Coregonus sp., movement and distribution studies in 1971 and 1972. Variable mesh gillnets, with five 7.5 m panels of 3-1/2-inch bar mesh, and native fishwheels were used to collect cisco.

Fish were taken 3 km up the South Fork of the Kuskokwim River, the Yukon River from the Nowitna River mouth to Dall River mouth, the Porcupine River, the Koyuk River in Norton Sound, and the Port Clarence-Grantley Harbor and Imuruk Basin area near Teller (Fig. 1). Gill raker counts, including rudiments, were made in the field on the excised first left arch. Age determinations were made using the scale method.

Taxonomy — The Bering and Arctic cisco are similar in appearance, both having a terminal mouth and immaculate pectoral and pelvic fins. The Bering cisco has significantly fewer gill rakers (x = 33.8-36.6) than the Arctic cisco (x = 42.1 from Colville River, n = 10; Alt and Kogl, 1973). Gill raker counts of C. laurettae from Bering Sea drainages are presented in Table 1 and range from...
21-40 total count and 18-24 on the lower arch. The highest counts are from the Koyuk River ($\bar{x} = 23.6$ on the lower arch) and the lowest counts are from Port Clarence-Grantley Harbor fish ($\bar{x} = 20.4$ on the lower arch).

**Movements** — Bering cisco are generally more abundant near the coast. During limnological investigations of the Port Clarence, Grantley Harbor, and Imuruk Basin area in 1971 and 1972, 21 Bering cisco (seven net nights) were taken in Port Clarence and Grantley Harbor where the salinity ranged from 27% to 31%. Only four were taken in the Imuruk Basin area (35 net nights) where salinity was 1-4%.

Ten Bering cisco, all potential spawners containing large eggs, were taken in the South Fork of the Kuskokwim River, 840 km from the ocean, in late July during 2 net nights of fishing. No cisco were taken during extensive test netting in the area of the Holitna River in June and July, nor were any taken during test netting of other upper Kuskokwim tributaries in September. The spawning run was not followed further. No spawning checks were found on the scales of these fish.

Bering cisco are present at the mouths of middle Yukon River tributary streams early in the summer (Nowitna River — June 7, Porcupine River — June 17) and numbers fluctuate (Table 2). This is a spawning migration and all fish examined had large eggs. During June, 1972, when 273 cisco were taken in the lower 500 m of Hess Creek (40 km above Rampart); a gillnet was set 3.2 km up Hess Creek, but no Bering cisco were taken. Test netting at the mouths of Hess Creek, Ray and Dalí rivers, July 8-22 took only 12 Bering cisco (all mature), and again the net 3.2 km upstream in Hess Creek contained none. The lower 110 km of Hess Creek was floated August 21-23 and no cisco were noted. Nets at the mouth of Hess Creek at this time took only one Bering cisco.

At Rampart, a fishwheel operating in the Yukon River from August 25 to October 1 took 180 Bering cisco. During the peak of this run, September 4-8, up to 18 were taken per day. The run abruptly stopped on September 16. All fish had large eggs and would probably spawn that fall. The spawning grounds of these fish are still unknown. Some evidently spawn in the Yukon River system upstream of the mouth of the Porcupine River as a fishwheel at Fort Yukon took four to six cisco per day in late August.

The presence of Bering cisco in the lower Porcupine River 1610 km up from the mouth of the Yukon on June 17 suggests overwintering in the middle Yukon area or a very rapid upstream migration.

**Table 1.** Gill raker counts of Alaskan Bering cisco.

<table>
<thead>
<tr>
<th>Area</th>
<th>n</th>
<th>Range</th>
<th>$\bar{x}$</th>
<th>$\text{sd}$</th>
<th>Range</th>
<th>$\bar{x}$</th>
<th>$\text{sd}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Clarence-Grantley Harbor</td>
<td>21</td>
<td>31-36</td>
<td>33.8</td>
<td>1.50</td>
<td>18-23*</td>
<td>20.4</td>
<td>1.17</td>
</tr>
<tr>
<td>Koyuk River</td>
<td>7</td>
<td>34-40</td>
<td>36.6</td>
<td>2.07</td>
<td>21-24</td>
<td>23.6</td>
<td>0.97</td>
</tr>
<tr>
<td>Yukon River</td>
<td>7</td>
<td>33-37</td>
<td>35.5</td>
<td>1.28</td>
<td>20-24</td>
<td>22.0</td>
<td>0.95</td>
</tr>
<tr>
<td>Hess Creek</td>
<td>24</td>
<td>33-37</td>
<td>34.4</td>
<td>1.36</td>
<td>21-23</td>
<td>21.6</td>
<td>0.72</td>
</tr>
<tr>
<td>Porcupine R.</td>
<td>8</td>
<td>33-37</td>
<td>34.6</td>
<td>1.40</td>
<td>20-22</td>
<td>21.4</td>
<td>0.69</td>
</tr>
<tr>
<td>South Fork of Kuskokwim R.</td>
<td>10</td>
<td>33-37</td>
<td>34.6</td>
<td>1.40</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* $n = 18$
No indication of retained eggs was noted. Both male and female Bering Cisco were aged. The Hess Creek sample was selected to include fish of the entire length range captured. The majority of Hess Creek males were age V and VI while females were age V, VI, and VII. The Port Clarence-Grantley Harbor fish were mainly immature of age III, IV, and VI. One age VII female was captured. Data were analyzed using the abbreviated Doolittle Method (Draper and Smith 1966) and indicated no significant difference between growth of males and females from Hess Creek (α > .1) and Port Clarence-Grantley Harbor (α > .5) at the 90% confidence level. Sexes were combined in the comparison of growth of Hess Creek Bering cisco and Port Clarence-Grantley Harbor fish (Fig. 2). Hess Creek fish grew faster than Port Clarence-Grantley Harbor fish (abbreviated Doolittle Method gave α < .001).

Age and growth—Ninety-seven Hess Creek (56 males, 315-475 mm; 41 females, 335-480 mm) and 19 Port Clarence-Grantley Harbor (10 males, 235-340 mm; 7 females, 235-350 mm) Bering Cisco were aged. The Hess Creek sample was selected to include fish of the entire length range captured. The majority of Hess Creek males were age V and VI while females were age V, VI, and VII. The Port Clarence-Grantley Harbor fish were mainly immature of age III, IV, and VI. One age VII female was captured. Data were analyzed using the abbreviated Doolittle Method (Draper and Smith 1966) and indicated no significant difference between growth of males and females from Hess Creek (α > .1) and Port Clarence-Grantley Harbor (α > .5) at the 90% confidence level. Sexes were combined in the comparison of growth of Hess Creek Bering cisco and Port Clarence-Grantley Harbor fish (Fig. 2). Hess Creek fish grew faster than Port Clarence-Grantley Harbor fish (abbreviated Doolittle Method gave α < .001).

No comparative Bering cisco age and growth data are available in the literature. Ten mature Bering cisco taken 3 km up the South Fork of the Kuskokwim in July (320-410 mm) were age III-VII and had age-length relationships similar to Hess Creek cisco. One male was age III, one female was age IV, and the remainder were age V or older. Both male and female cisco from Hess Creek became mature at age IV. Only one male of age VIII was taken but five females of age VIII averaged 439 mm. No indication of retained eggs was noted in Hess Creek fish.
Faster growth of Kuskokwim and Yukon river fish is to be expected because of their longer growing season. Broad whitefish from these areas grew faster than broad whitefish from the Imuruk Basin-Grantley Harbor area near Teller (K. T. Alt unpublished data.)

**Food habits**—All the Bering cisco examined from the Yukon and Kuskokwim rivers (June through September) were potential spawners and had empty stomachs, a condition common to many species of whitefish in Alaska.

Limited data from the Port Clarence-Grantley Harbor and the Koyuk River indicated cisco were feeding on invertebrates and small fish.

**Acknowledgments**—This investigation was conducted with U.S. Federal Aid in Fish Restoration funds.

**DURING** regular collections by ichthyology students, two specimens of the slender eelblenny were caught in coastal waters of Nova Scotia (Fig. 1).

The specimens, both female, were captured with a small seine net at low tide on September 18 and October 11, 1971 in the same locality, Marriott's Cove, at 44°33'N, 64°15'30"W, a long, narrow cove in Mahone Bay, Lunenburg Co. They were caught in daylight some 10 ft from shore in an eelgrass-marsh area, 12 ft deep; the bottom sandy, with a few boulders. Water temperature was 60°F.

The Arctic waters of Eurasia and America have been given as the range of distribution for the species (Ehrenbaum-Helgeland 1950; Jensen 1944; Suvorov 1948; Shmidt 1950; Gordon and Backus 1957). Leim and Scott (1966) summarized data for Canadian specimens from Labrador, Ungava Bay, and Gulf of St. Lawrence. According to Dunbar and Hildebrand (1952) this species is Arctic-subarctic with a wide tolerance.

Some of the diagnostic characters that distinguish this blenny are: dorsal rays, 60-65; anal, 38-45; pectoral, 15-17; vertebrae 67-70.

The Nova Scotia specimens, measuring 220 and 230 mm, had the following counts: dorsal, 61 rays both; anal, 41 both; pectoral, 13 and 15, respectively, and 68 vertebrae each. Both specimens are deposited in the N.S. Museum, Halifax, numbers NSM 973-Z-698 and NSM 973-Z-699.

**The Slender Eelblenny, Lumpenus fabricii, a Southern Record in Nova Scotia Waters**

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Two specimens of Lumpenus fabricii (Valenciennes) were found in the coastal waters of Nova Scotia. Their capture represents the most southerly record of the species as well as the first record for the province of Nova Scotia.


Deux spécimens de lompéne élancée, Lumpenus fabricii, ont été capturés dans les eaux côtières de la Nouvelle-Ecosse. Leur capture représente le record le plus méridional et le premier pour cette province.

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