Our internet address is: songbird@alaska.net
telephone (907) 262-9769

To: Dr. Robert Behnke, Dep't of Fishery and Wildlife Biology, Colorado State University, Ft. Collins. Co.

From: Jack Dean, P.O. Box 428, Sterling, AK 99672

Subject: Arctic char or charr or charr, Swanson and Kenai River Watersheds, Kenai Peninsula, Alaska.

Three species of char are present on the Kenai Peninsula. Lake Trout are found in all of the larger lowland lakes in the Kenai River basin. They are also present in two mountain lakes in this watershed where they may not be native. Lake trout are also present in the headwater lake of the Chickaloon River. These fish may also have been introduced. Lake trout are present in Tustumena Lake (73,000 acres) in the Kasilof River watershed where they are believed to be native.

Dolly Varden are widely distributed throughout the Kenai Peninsula both as resident and anadromus populations. There is a color variant known locally as the golden fin dolly. This fish is found in headwater locations in the center of the peninsula.

The only Dolly Varden pyloric caeca and gill raker counts I'm aware of were made on seven fish from Camp Island Lake. This lake is in the Moose-Kenai River watershed on the Kenai Nat'l Wildlife Refuge. These Dolly Varden had mean pyloric caeca counts of 25.9 and mean gill raker counts of 19.4 (Table 1). This analysis was made by FWS fishery biologist Rebecca Everett (Booth, 1986).

Arctic char have been collected from about 50 lakes in the lowland Swanson River watershed by the ADF&G and the FWS during the past four decades. This species is a lake spawning, lake resident fish in our area. In 1964, 19 Arctic char from land-locked East Finger Lake were analyzed for pyloric caeca and gill raker counts. These char had mean pyloric caeca counts of 45.8 (range 39-59) and mean gill raker counts of 21.5 (range 19-23) (Table 1). You said these gill raker counts may be under counted because every bump on the first gill arch has to be counted to obtain valid gill raker counts for comparative purposes.

Bob, here's some background information on our peninsula Arctic char. Kenai National Wildlife Refuge Arctic char share every lake with threespine sticklebacks. Other species that occur in some of

the char lakes include: rainbow trout, longnose suckers, coho salmon, coastrange sculpins and Arctic lamprey.

Biologist from the ADF&G studied the depth distribution of Arctic char in East Finger Lake in 1967-1968 (Engel,1969). This study indicated these char avoided prolonged exposure to water temperatures above 50 F.

Fish in spawning color are seen in October. Spawning occurs in later October about the time these lakes usually freeze over. They appear to be alternate year spawners. Spawning males are a golden color, with large pink spots and white edged ventral fins. They are strikingly beautiful in appearance. They have been reported from lakes in the Swanson River watershed that vary in size from 10 to 490 acres, maximum depths from 20 to 105 feet and alkalinities from 1 to 90 p.p.m. They are heavily parasitized. These char feed on snails, sticklebacks, sculpins and aquatic insects. The largest Arctic char reported during lake surveys was a 4.55 pound fish. Most of the Arctic char my wife and I catch weigh between 0.3 to 1 pound. I consider a two pounder a big fish and a three pounder trophy sized.

These Arctic char probably survived the last glacial period in a refugium somewhere in the Swanson River watershed and have not expanded their range outside this watershed. They have not been reported from the adjacent Moose and Chickaloon River watersheds even though there are deep lakes in both watersheds that appear suitable for this species.

In the mid-1980's, I caught a small char in Cooper Lake, on the Chugach National Forest, and counted its pyloric caeca. My counts showed this fish to be and Arctic char. This was a surprise since this species had never been reported from this lake. I recently had a discussion with biologist Vicki Davis about the relicensing of the Cooper Lake hydro project. I mentioned the lone fish that I'd caught years ago. Ms. Davis became intrigued and asked me if I'd assist with a fish sampling effort. I agreed.

Our survey crew consisted of fishery biologist Patty Berkhahn from ADF&G, Vicki Davis and Mark Wagner from the FWS and myself. Mark Wagner used a snow plow to clear a trail so we could launch a boat.

The north end of Cooper Lake was ice-covered when we arrived. The

south end of the lake froze over while we were there. Patty set three variable mesh gill nets for three hours each on 11/22/99. Our catch included several stocked rainbow trout and six char.

Four of the char were good sized fish that ranged between 13.4 to nearly 18 inches in total length and weighed between 0.6 to 1.8 pounds. They appeared to be typical non-spawning Arctic char. They had large spots and forked tails. The two small char, about 9.5 inches in total length, had small spots although one had a large spot on each side. Both small char also had forked tails and were sexually mature. Eggs were readily expelled from the small female. Externally they appeared to be Dolly Varden. What was unusual was that they were over a mile from any of Cooper Lakes larger tributaries. Each fish also showed 14 faint parr marks on each side that struck me as unusual markings for mature char.

One gill net was set in shallow water at the south end of the lake near the mouth of one of the major tributaries. Two adult rainbow trout were captured in this net.

All the char were caught in two nets set on moderately steep, rubble covered, slopes within 200 yards of the outlet structure. The two small char appeared to be spawning in the lake. Seepage areas were evident nearby, above the water line, suggesting the small char may have been spawning on underwater seeps or springs. Two of the larger char had fresh salmonid eggs in their stomachs suggesting that spawning had occurred in the vicinity of our near-shore net sets.

The next day ADF&G fishery biologist Larry Larson and I made the pyloric caeca and gill rakers counts. Three of the four large fish had pyloric caeca counts within the Arctic char range (37 to 75) (Table 1) as described by Morrow, 1980. Two of the large char had yellow bellies suggesting the remnants of last years spawning colors. One large char, with 35 pyloric caeca, was outside the Arctic char range.

The two small char fell within the overlap pyloric caeca range for both species (13 to 35 rarely up to 40 for Dolly Varden (Table 1), (Morrow, 1980).

The gill raker counts for both large and small char were the same and averaged 23 (range 22-24). This number is within the overlap

range of both Arctic char (23-32) and Dolly Varden (11 to 26) (Morrow, 1980).

Our sample sizes were small but it's unusual to have all the small fish sexually mature and all the large ones with undeveloped gonads.

A further surprise was that the small char in Cooper Lake showed the same pyloric caeca counts and nearly the same gill raker averages as normal sized Arctic char from Falcon Lake (Table 1), (Booth, 1986).

Even more surprising was the fact that the small char in Cooper Lake were more closely aligned with Arctic char than with the Dolly Varden in Camp Island Lake (Table 1).

Pectoral fins from the six Cooper Lake char were clipped for analysis at the FWS genetics lab in the Anchorage Regional Office.

Three of the largest char from Cooper Lake provided the first evidence of Arctic char in the Kenai River watershed.

Cooper Lake was a natural lake until it was dammed years ago to store water for a hydro-electric plant. The present reservoir is 5 miles long, has a maximum depth of 475 feet, clear water and an alkalinity of about 35 p.p.m. The elevation of the reservoir is 1,200 feet. Tree line extends up to about the 1,600-1,700 foot level.

Prior to construction of the dam Cooper Lake was drained by Cooper Creek that provided spawning habitat for several species of resident and anadromus salmonids from the Kenai River. After the dam was built, the entire outflow of the lake was diverted through a tunnel to a power plant on Kenai Lake. Stream flows and temperatures then decreased significantly in Cooper Creek.

There is a barrier, about 30 feet high, in Cooper Creek that prevented anadromus fish from reaching the lake even before its outlet was dammed. If this has been a stable barrier, the char in Cooper Lake may have been isolated for 1,000's of years.

Chugach Power Company owns and operates this hydro-electric facility. Their FERC operating license comes up for renewal in a

couple of years. The power company wants to raise the dam and make other modifications. Several groups of concerned citizens are opposed to increasing the height of the dam. Others want the dam removed and the watershed returned to its natural condition.

I want to thank you for your assistance, Bob. Do you have any insights that might make our search for the relationships of these char easier?

Literature cited:

Booth, Jeffery A. and Jack L. Dean. 1986. Moose River basin fishery investigation - 1985. Progress report. Kenai Fishery Resources Station, Alaska. Unpublished.

Engel, Larry J. 1969. Inventory and cataloging of Kenai Peninsula, Cook Inlet and Prince William Sound drainages and fish stocks. ADF&G. Federal Aid F-9-1, Report No. 7-A.

Morrow, James E. 1980. The Freshwater Fishes of Alaska.

Tobin, John H. III and Douglas E. Palmer. 1997. Fishery and limnological surveys of 25 lakes on the Kenai National Wildlife Refuge, Alaska, 1993. U.S. Fish and Wildlife Service. Alaska Fisheries Data Series No. 97-3.

Attachment: photos.

PS. How's Dr. McConnell doing?

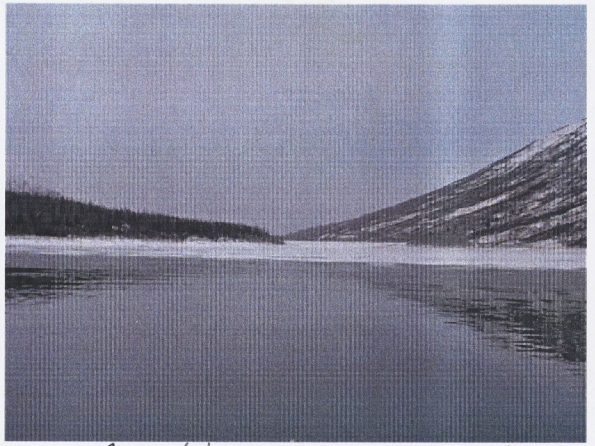
Table No. 1. Char pyloric caeca and gill raker counts, Kenai Peninsula, Alaska.

Species	Lake	Watershed	Year	Number of fish analyzed	Pyloric caeca		Gill rakers	
					Mean	Range	Mean	Range
Arctic char	E. Finger	Swanson R.	1964	19	45.8	39-59	21.5	19-23
Dolly Varden	Camp Island	Moose-Kenai R.	1985	7	25.9		19.4	
Arctic char	Falcon	Swanson	1993	2	37.5	37-38		
Arctic char	Falcon	Swanson	1993	6			24.0	22-26
Arctic char	M. Finger	Swanson	1993	3	46.7	45-49	24 (1 fish)	
Arctic char	Cooper	Kenai	1999	3	43.0	41-45	23.0	22-24
Large char?	Cooper	Kenai	1999	1	35		23	
Small char?	Cooper	Kenai	1999	2	37.5	37-38	23.0	23
Total				43				

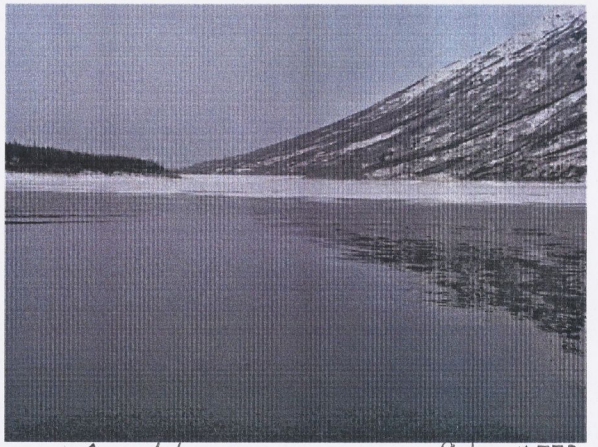
Jack Dean (Vol, retired FWS Fish Bio)
Patty Berkahn (ADF+G, Sportfish)
Mark Wegner (Kenai NWR)
Vicki Davis (FWS ES/REFUGE)

Cooper Lake Site Visit November 22, 1999
Time: 11:26am to 3:30pm

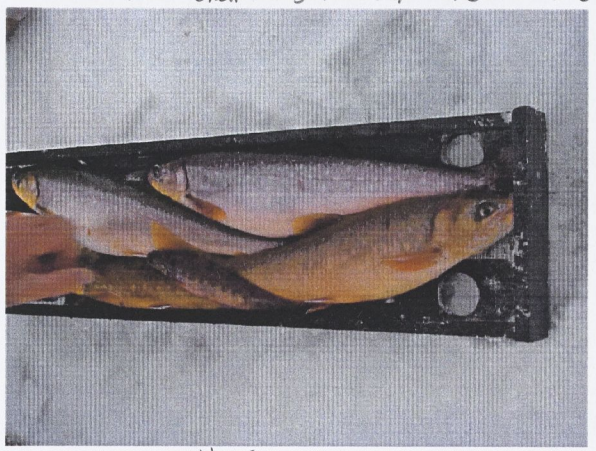
Close up of Char caught in Cooper Lake #778



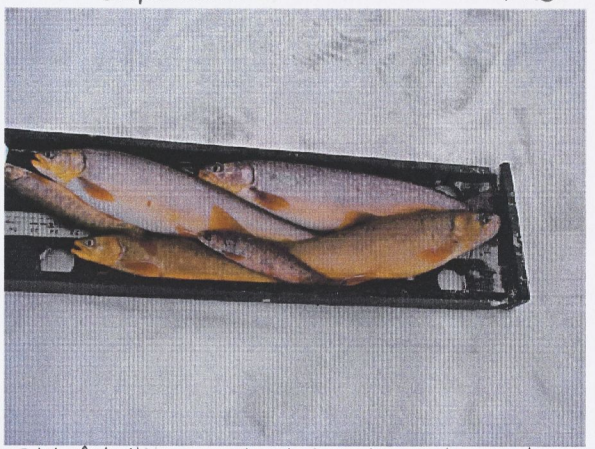
Cooper Lake #775



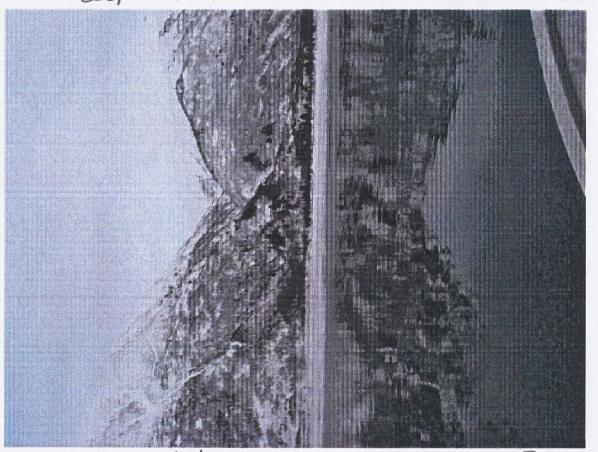
Cooper Lake Photo #772



Char #779

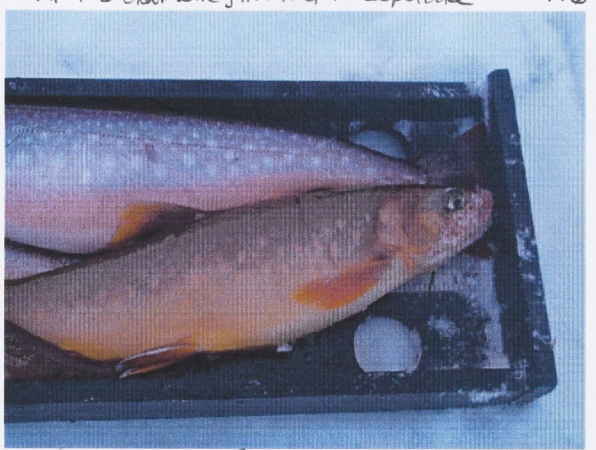


Total of 6 Char were gill netted in Cooper Lake #776



Cooper Lake #773

one of the 6 Char caught in Cooper Lake #780



fish removed from Cooper Lake #777
Close up
species: Char

Cooper Lake #774

* 4 Rainbow Trout were netted & released

Cooper Lake
Site Visit Nov. 22, 1999

CHAR #787

CHAR #784

CHAR #781

CHAR #788

CHAR #785

CHAR #782

Vicki Davis Jack Dean Patty Berkahn #789

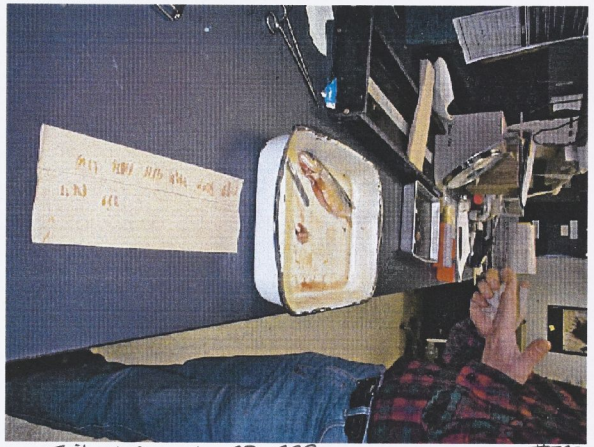
photo taken by Mark Wegner

CHAR #786

CHAR #783

Cooper Lake Project

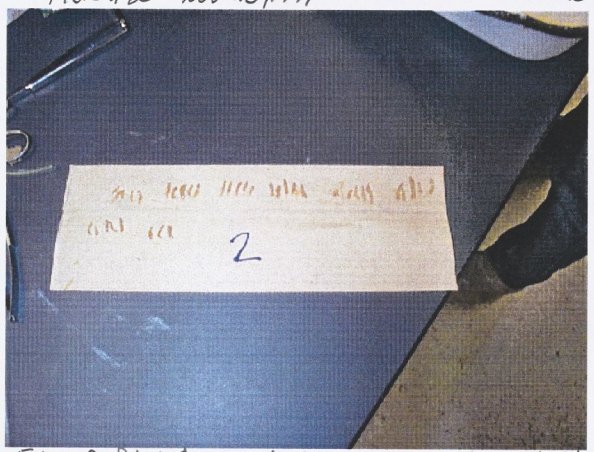
Fish # 2 ♂ #796



Fish # 2 Nov 23, 1999 #793

Nov 23, 1999 Vicki Jack # 789

Gill rackers from Fish #2 #797

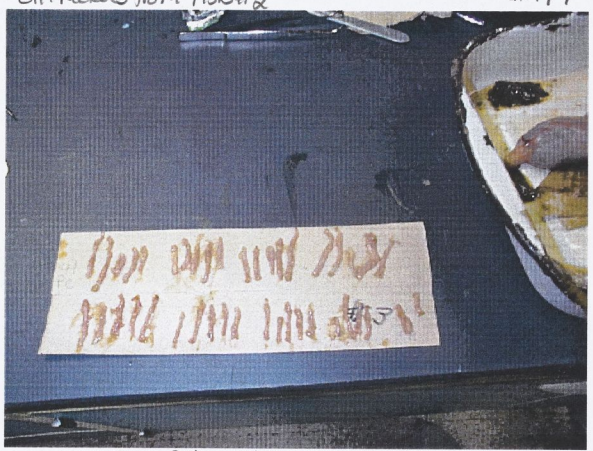


Fish # 2 Pyloric Caeca count 38 #794

LAB WORK PERFORMED on Nov 23, 1999 @ KNWR

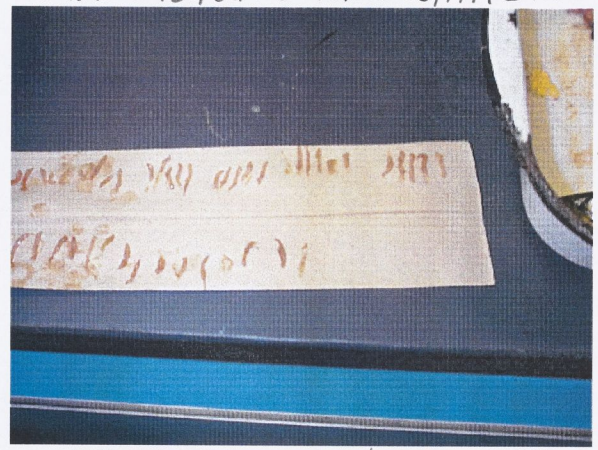
Examining Fish #1

#791



Fish # 3 Pyloric Caeac Count = 41 #798

Fish # 2 mature male, sperm running #795



Fish # 1 Male not mature #792

Pyloric Caeca removed from Fish #1

PC count 43

Cooper Lake Project
Lab work performed on Nov 23, 1999 @ KNWR

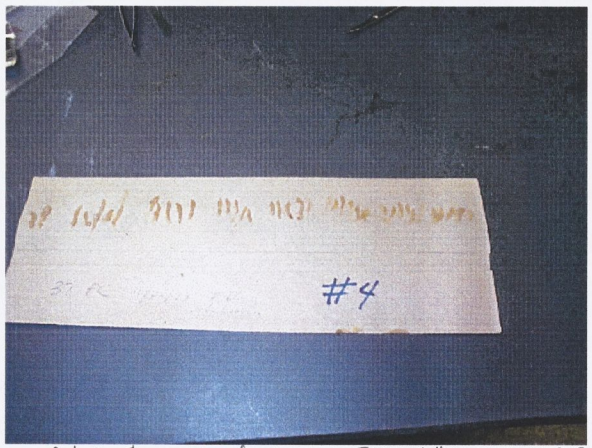
Dissecting performed by: Jack Dean (USFS)
Larry Larson (ADFG)
data recorded by: Vicki Davis (FWS)

Fish #5 weakly developed testes #805

EGGS of Fish #4 #802

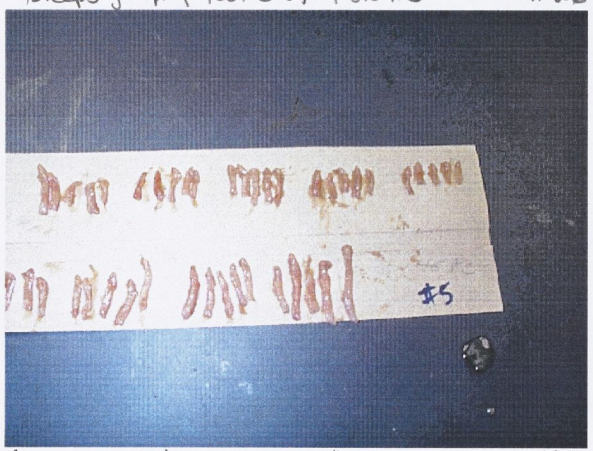

Removing snail from stomach of Fish #3 #799

forceps grasping testes of fish #5 #806

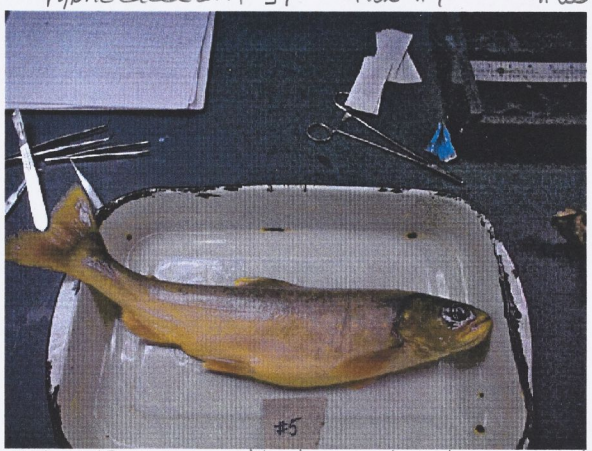


Pyloric Caeca count 37 Fish #4 #803


Fish #3 (male undeveloped) #800



fish #5 pyloric Caeca 45 #807



Fish #5 Male weakly developed testes #804

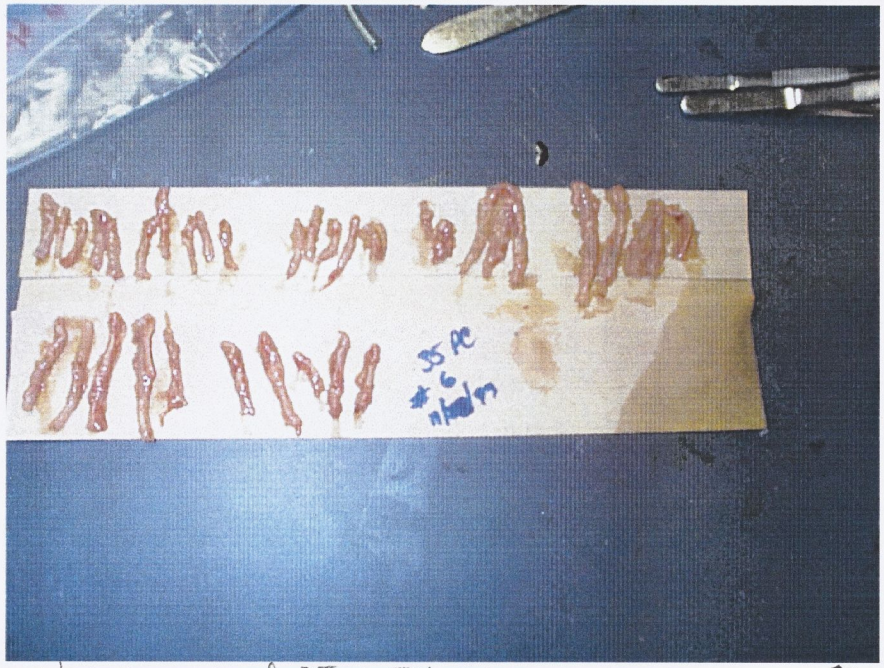
Fish #4 Female mature ripe eggs #801

Cooper Lake Project
Lab workcad performed on Nov. 23, 1999 @ KNWR

Dissecting performed by: Jack Dean (Vol)
Larry Larson (ADFG)
data recorded by: Vicki Davis (FWS)

Pyloric Cacea count 35 of Fish #6 # 810

pyloric cacea of fish #5 Count 45 # 808



pyloric cacea count 35 of Fish #6 # 811

fish #6 Immature Male # 809

Date: Thu, 24 Feb 2000 12:48:57 -0900
From: Kitty Mecklenburg <ptsteph@ptialaska.net>
Reply-To: ptsteph@ptialaska.net
Organization: Pt. Stephens Research
X-Mailer: Mozilla 4.7 (Macintosh; U; PPC)
X-Accept-Language: en
To: fwb@cnr.colostate.edu
Subject: Request for reprint

Dear Dr. Behnke:

It seems like yesterday that we talked about Salvelinus in Alaska, but it was October 1998. I am struggling to finish the Fishes of Alaska manuscript, and finally see light at the end of the tunnel. The book should be in the hands of AFS for printing in May or June. They have already examined and approved several chapters we provided in final, Pagemaker format on disks, so it looks like the time between when we turn it all in and the book hits the streets will be relatively brief (compared to the old days, before computerized page makeup).

In trying to finalize the salmonids, I find I am missing what appears to be a critical paper of yours: 1989, Interpreting the phylogeny of Salvelinus, Physiol. Ecol. Japan Spec. 1:35-48. Everybody reviewing the problems cites it, but our interlibrary loan service has not been able to obtain it. Could you please send me a copy? It has been very frustrating to try to work around not having it. I think I have everything worthwhile on the subject but this one piece -- unless you have written something more recently.

Interesting factoid about S. leucomaenis: Boris Sheiko, who now works in Arcady Balushkin's lab in St. Petersburg, looked up records of occurrence on the Commander Islands for me. I wanted to be sure of its known range -- whether or not it occurs in the Aleutian chain. Dr. Fedorov and Boris listed it from the Commanders, following Andriashev (1939), on a draft checklist of Commander fishes I reviewed for them. Anyway, Boris found that ZIN has only 2 lots from Bering Island, which were originally identified by P. Schmidt as S. leucomaenis. One was reidentified as S. malma by Taranetz in 1933, and lost during WW II. Boris examined the other, and it, too, is S. malma. Dr. Andriashev cannot say now, of course, whether those specimens were his only argument for giving its range to the Commanders (in his 1939 work), but I am probably safe in concluding that S. leucomaenis does not occur in the Aleutian chain -- I think the nearest record is probably southeastern Kamchatka.

You probably knew all that, but maybe not.

I am now affiliated with the University of California, Santa Barbara, Marine Science Institute, as an "Associate Specialist." Although I am working on USGS-sponsored projects with people located down there (Milton Love, mostly), I will continue working out of our home north of Auke Bay, Alaska. Spent 2 weeks in November working with the USNM

collection (my third visit to that collection), and in mid-March will spend a week at the University of Alaska Fairbanks museum. That will finish up the museum work for Fishes of Alaska, but after that I will be looking at fishes in CAS, LACM, UBC, and others to help verify ranges for an inventory of West Coast marine fishes, from tip of Baja to the Alaska-Canada border in the Arctic. There is talk of adding Gulf of California fishes. So, never a dull moment.

Hate to bother you with this seemingly trivial request for the paper -- but for me it is very important.

Thanks for your help. I hope you will review the salmonid section when it is done to the best of my ability.

Sincerely,
Kitty Mecklenburg

Catherine W. Mecklenburg
Point Stephens Research
P.O. Box 210307
Auke Bay, AK 99821
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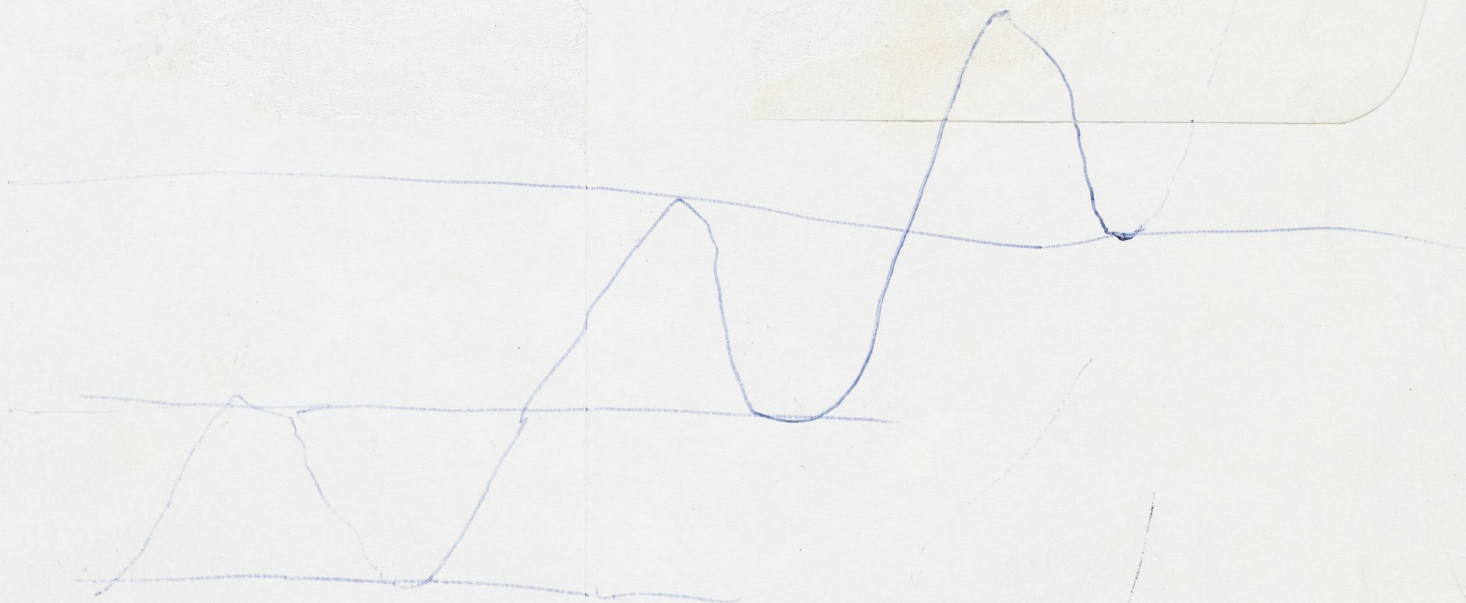
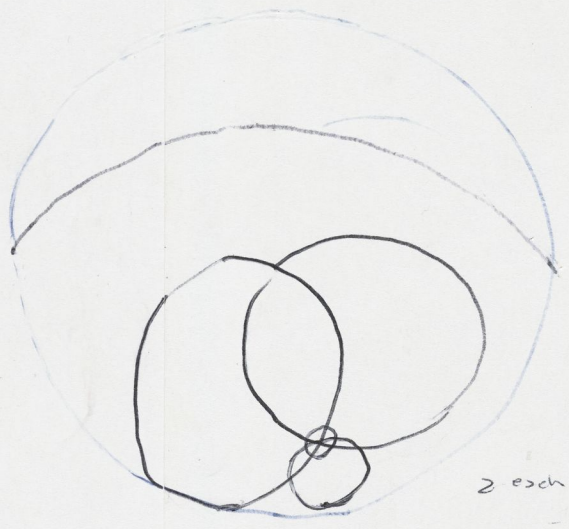


– next ee
1997 ATS Abst
"new sp." BZM –

– Kathy Mecklenburg
letter



detect ; ~ 5%
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20% + + + ;

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2 each 10 ? 5 N = 10
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95 100

(1)

Nordeng, H.

This paper will require some editing. Although the author knows English very well, there are many places that remain unclear and need rewriting to convey more precisely the intended meaning. The title "Solution to the char problem", should be changed. This paper does not solve the problem of the origin and classification of sympatric populations of S. alpinus. The conclusion that all three "forms" -- small resident, large resident, and anadromous are only manifestations of polymorphism of a single gene pool is not supported by the data. The data clearly shows that there is a hereditary component for anadromy and for age at sexual maturity, and this is clearly stated in the text. I can assume that the author believes the hereditary basis is so labile that a single generation of selection in a hatchery can change one type into another, as highly unlikely. → The fact is that anadromous parents gave rise to more anadromous offspring who matured later than offspring of resident char. This can not be readily explained as originating from a single gene pool.

A fact ignored is that the hatchery environment can mask or suppress hereditary traits. How long were the young raised in the hatchery before release in all experiments? There may also have been hereditary qualitative differences that were not apparant from the study. For example, in those char from resident parents that became anadromous, was their life history identical to the "true" anadromous char? -- time of out migration, time at sea, area of sea exploited, growth, time of return migration?

→ another. Table 7 reveals that in the experiments where all offspring were raised under identical conditions, the offspring from anadromous parents were significantly "more anadromous" than the offspring of resident parents (both from Salangen R. system) in ratios of 47 and 60% vs. 22 and 29%. ~~These data refute the notion of a single gene pool explaining anadromous and resident behavior.~~

From the facts presented I surmise that the author was dealing with two forms in the Salangen River -- anadromous and resident (two reproductively isolated gene pools). The "small resident form" is only the early maturing fraction of the "large resident form" and since ~~they~~ many become older and larger and spawn with large resident fish, I can not envision how there could be two genetically based resident forms "~~of the~~" in this case. In every ~~case~~ example where electrophoretic study has been applied to sympatric stocks of S. alpinus, reproductive isolation between the stocks ("forms" or populations) has been demonstrated beyond any reasonable doubt. The title of the paper implies that all sympatric stocks, 'forms', or populations of S. alpinus can be explained as variability manifested within a common gene pool. ~~This~~ Obviously, this is not true and the data from the Salangen River also supports the case of a hereditary basis and reproductive isolation between anadromous and resident S. alpinus. Has electrophoresis of these 'forms' been carried out? The results may be inconclusive due to the limited ~~polymo~~ allelic polymorphism typical of S. alpinus, but such data should be available before the conclusion of a "single gene pool" is ~~published~~ made.

The paper does present a good case for the great adaptive plasticity of S. alpinus and this is well known for salmonid fishes in general. Resident rainbow trout and resident sockeye salmon when raised in a hatchery and stocked into rivers have been known to go to sea. Also many

(3)

anadromous salmon and trout species have established resident populations when stocked in lakes. This demonstrates a range of adaptive responses of ~~Sa~~ salmonid genotypes, but certainly doesn't disprove the hereditary basis for anadromous vs. freshwater life histories (see Ricker, 1972, Hereditary and environmental factors affecting certain salmonid populations. H.R. MacMillan Lectures in Fisheries, Univ. British Columbia).

In general, it would be much more effective for evolution to act to specialize for resident and anadromous stocks, rather than to let a "single gene pool" try to make full use of the total freshwater and marine environment available to a species. I suspect that this is also the case in the Salangen River system. Are the Salangen resident char fluvial or lacustrine -- is there not a resident lacustrine stock in ~~Ø~~ Øvervatn?

I have strong reservations concerning the author's belief that a parasite is the cause of nonanadromy in southern populations. Throughout the range of Salvelinus, Salmo, and Oncorhynchus, in Europe, Asia, Africa, and North America, nonanadromous populations always occur further south of anadromous populations in every species having both life history forms. I doubt that parasites could be the common causality factor or even a partial explanation of this phenomenon.

I would suggest the paper could be revised so that it presents the wealth of information on plasticity and adaptability of a genotype without "solving the char problem" and making unwarranted conclusions.

If the author still has doubts that

there is a genetic basis determining life history differences in intraspecific sympatric populations of salmonid fishes, ~~exhibiting different life histories~~. I would suggest reviewing the following two publications: Fish gene pools. 1980. N. Ryman (ed.), FRN, Stockholm, and vol. 38 no. 12 (Dec. 1981) of the Can. J. Fish. Aquat. Sci. (Proc. STOC symposium).

9 November 1981

Dr. Yasunobu Yasue
Professor Emeritus, Okayama University
Nakamachi 5-17-9
Setagaya-Ku, Tokyo 158
Japan

COPY

Dear Dr. Yasue:

Thank you kindly for your reprints on the Formosan trout and on Japanese charr, I attended a charr symposium in Canada in May. Six Japanese scientists were at this symposium, indicating a great surge of interest in Salvelinus (as also evidenced by the book on trout and charrs in which your papers were published).

I am preparing a new paper on Salvelinus for the proceedings of this symposium and will forward a copy of it to you when it is completed. In the meantime, under separate cover, I have sent a copy of the abstracts of papers presented at the Canadian charr symposium so you can see the range of subject matter that was covered.

In my new paper, I will agree with Japanese ichthyologists that S. plumbries is probably derived from S. leucomaenis and not S. malma (that is, I will consider plerries as a subspecies of leucomaenis). The red spots on plerries has previously led me to associate plerries with molma. Dr. Maekawa also convinced me that the miyabei charr of Lake Shikiribetsu is certainly a specialized form of molma and not derived from S. alpinus.

I would be most grateful to receive your comments on Japanese charr classification or of recent Japanese publications on the subject that I may not be aware of so that I may include the most recent information in my new paper on Salvelinus.

Sincerely,

Robert Behnke
Associate Professor

5 November 1982

Dear Professor Yasue:

I want to express my sincere gratitude for the O. masou, O. rhodurus book to which you so kindly added English translations of titles and for the reprints of Korean fishes, color photos, etc.

I have had to devote attention to other projects and only recently was I able to assess the Japanese literature and put together my thoughts to pose some questions and to make some comments.

First, I must say that the Yamame, amago book has strikingly beautiful color photographs -- an invaluable reference work. In the reprint by Ito, Isa, and Yamauchi (1973) on the iwame on Shikoku, they mentioned that they crossed iwame with amago and would further study the genetics of iwame. Was anything further published on this study? Was it mentioned in the Yamame, amago book? The problem I find with O. iwame is that the taxonomic characters of sympatric O. rhodurus have not been published to compare with the iwame specimens. That is, there is no evidence, that I am aware of, to demonstrate that the iwame is a reproductively isolated species rather than only an expression of recessive alleles at a gene locus governing spotting and parr markings.

Color photograph 44 illustrates an O. masou without markings. Why would not this specimen be considered as "iwame"? I note the article by Saito reports that both amago and yamame occur sympatrically in the Sakawa River drainage near Hakone. This appears to be the best documentation that they can occur sympatrically and maintain reproductive isolation?

I would like to know when O. rhodurus was introduced into Nepal (photo 32)?

I noted in the list of papers presented at the 1982 meeting of the Japanese Society of Ichthyology that several papers on salmonid fishes were given; perhaps some of this work will be published in future issues of the journal.

Your color photographs of the mountains and a mountain brook on Kyushu brought back memories of the magnificent beauty of the mountain scenery of Japan. I was in Japan about 30 years ago. Every day that I was free I would take the train into the mountains west of Sendai. I would leave the train at the small village of Okunakawa and hike through the mountains. I would also have a fishing rod and a camera to catch yamame and iwana and record their beauty on film. I also remember the hospitality and kindness of the people of the village. I often wonder if there has been much change in Okunakawa during the past 30 years?

Sincerely,

Robert Behnke

TO:

Professor Dr. Y. Yasue
Nakamach: 5-17-9
Setagaya-ku, Tokyo 158
Japan

2 December 1981

Professor Y. Yasue
Nakamachi, 5-17-9, Setagaya-ku
Tokyo 158, Japan

Dear Professor Yasue:

I do not have a copy of the book of Salvelinus you mentioned in your postcard. I saw this book at the charr symposium in Winnipeg and I would be very pleased to receive a copy. I know some Japanese scientists here at our university and they assist in the translation of key sections of Japanese papers. I showed your paper on Salmo saramao to Dr. Wu, an invertebrate zoologist from Taiwan, now at the University of Colorado (Boulder, Colorado). Dr. Wu was extremely interested because he was a former student of Dr. Ting Pong Koh and he was one of the students who collected the O. masou specimens in 1960 that were sent to me for the publication of Behnke, Koh, and Needham (1962).

Sincerely,

Robert J. Behnke
Associate Professor
Fishery Biology

S. Kimura,
Department of Fisheries,
Faculty of Agriculture,
Kyushu University 46-04,
Hakozaki, Fukuoka-shi,
812 J A P A N

PAR AVION
BY AIR MAIL

Dr. R. J. Behnke,
Department of Fisheries and Wildlife Biology,
Colorado State University, Fort Collins,
Colorado 80523, U. S. A.

— Decker
2xW sent on
June 11 ;

Department of Fishery and Wildlife Biology

Colorado State University
Fort Collins, Colorado
80523

April 25, 1985

Dr. S. Kimura
Department of Fisheries
Faculty of Agriculture
Kyushu University 46-04
Hakozaki, Fukuoka-shi
812 Japan

Dear Dr. Kimura:

I would enjoy the opportunity to have you visit my laboratory in 1986 and to cooperate in a research project of mutual interest on the systematics of Salvelinus.

For planning your visit, I should point out that my university does not have a museum and I maintain a minimal collection of specimens. I forward most of the valuable specimens to major museums for permanent repository after I complete my studies. Ted Cavender, at the Ohio State University museum does have a permanent collection of Salvelinus. Thus, most of the time spent with me, would be devoted to the study of Japanese specimens you bring or send from Japan. For this purpose, formalin preserved specimens would be appropriate. Frozen specimens could be used for electrophoretic analysis, but such studies should be undertaken at a laboratory with proper facilities and expertise. I will inquire with Dr. Fred Allendorf, Univ. Montana, if this aspect might be arranged.

I would be particularly interested in a study to better denote relationships among the western Japanese S. leucomaenis (imbruis) and the eastern "pluvius", which I formerly considered to be derived from S. malma because of its red spots, and the various forms of S. malma of Hokkaido. Several of the populations of "malma" from Hokkaido, such as ones described in your paper in the Faculty of Agr. Sci. Bull. (including the "miyabe" char) have low pyloric caeca and vertebrae counts (often considerably lower than typical anadromous malma of Hokkaido. Perhaps these small resident char of Hokkaido are derived from a leucomaenis-pluvius ancestor rather than from malma. It would be necessary to discover anatomical features that can positively identify any specimens as part of the S. leucomaenis or S. malma evolutionary lines of phyletic divergence.

Under separate cover I have sent to you my most recent (unpublished) manuscript on the classification of Salvelinus.

Sincerely,

Robert Behnke

April 6, 1985

Dr. R. J. Behnke,
Department of Fisheries and Wildlife Biology,
Colorado State University, Fort Collins,
Colorado 80523, U. S. A.

Dear Dr. R. J. Behnke:

As I have much interests in your works on systematics and taxonomy of salmonid fishes in U. S. A., especially on charr systematics, I hope to visit Fort Collins. I am applying for the Abroad Resaerch Fellowship supported by Japanese Ministry of Education. Fortunately, I am decided informally to be granted this fellowship, therefore, I will visit U. S. A. and Canada in next spring and summer.

If I could obtain your kind approval, I would much like to stay in your laboratory from April to May in 1986 for about 40 days. I hope to see the American specimens of charrs and also hope to make a joint study with you on comparative morphology between Salvelinus leucomaenis imbrius and American species. I will bring for us some frozen and formalin specimens of S. l. imbrius distributed in the mountenous streams of south western Japan.

Of course, I shall pay all of my expenditures in my staying your laboratory such as living and travel expenses and so on.

For this purpose, I need a letter of invitation from you to get the final decision of my visit your country. I would, therefore, appreciate it very much if you would kindly send me a letter stating that you would agree to my visit your laboratory to do a joint work on salmonid fishes.

Please excuse me for giving you such trouble.

Best regards,

Sincerely yours,

S. Kimura

S. Kimura, Assoc. Prof.,
Department of Fisheries,
Faculty of Agriculture,
Kyushu University 46-04,
Hakozaki, Fukuoka-shi,
812 J A P A N

P. S. I am sending a similar letter to Dr. T. M. Cavender, Museum of Zoology, Ohio State University.