

KEY TO THE FISHES OF
MONTANA

Compiled from Various
Sources

by
GEORGE WEISEL

KEY TO SERIES OF ACTINOPTERYGII

I...skeleton cartilaginous or partly boney -----GANOIDEI

(Fishes with heterocercal or homocercal tail, ganoid cycloid or boney dermal plates, air bladder with an open duct connecting it with pharynx or esophagus, bulbus arteriosus present, spiral valve in intestine.)

II...skeleton boney-----TELEOSTEI

(Fishes usually with homocercal never heterocercal tail, scales cycloid or ctenoid or wanting, opercles present, air bladder usually present with rudimentary pneumatic duct or no duct, no spiral valve in intestine, bulbus arteriosus present.)

PART III

KEY TO ORDERS OF GANOIDEI

I...ganoids without scales, body naked or with bony plates, skeleton cartilaginous-----CHONDROSTEI

(Fishes with branchiostegals few or absent, tail heterocercal, spiral valve and conus arteriosus present, few investing bones, vertebral column with notochord and cartilaginous arches, pelvic fins abdominal.) *One family represented in Montana.

II...ganoids with body covered either with ganoid or cycloid scales, skeleton boney-----HOLOSTEI

(Cranial skeleton with many investing bones, branchiostegals present, vertebral column of bony vertebrae, tail heterocercal or homocercal, pelvic fin abdominal, reduced spiral valve, conus arteriosus present. (Garpikes)

PART IV

KEY TO THE ORDERS OF FISHES FOUND IN MONTANA

(After S. H. Pratt)

GANOIDEI

I...Fish with bony plates instead of scales----- (I) CHONDROSTEI
(Sturgeons)

TELEOSTEI

II...Fish without bony plates covering body.

A...Ventral fin, if present, abdominal.

1...Head without scales.

a...Fins without spines.

*...Branchiostegals 4 or more------(2)ISOSPONDYLI
(Whitefish, salmon, trout)

**...Branchiostegals 3 -----(3)EVENTOGNATHI
(Suckers, carp, minnows)

b...Fins with spines.

*...Barbels present, body scaleless------(4)NEMATOGNATHI
(Catfish)

**...No barbels present, sides naked------(5)THORACOSTEI
(Sticklebacks)

2...Head wholly or partly scaly, lateral line
wanting or imperfect.

a...Lateral margin of upper jaw formed of the
maxillaries, the premaxillary short------(6)HAPLOMI
(Pike & Pickerel)

b...Upper jaw formed by Premaxillary------(10)CYPRINODONTES
(Killifish)

B...Ventral fins thoracic or jugular in position.

1...Fins without spines------(7)ANACANTHINI
(Burbots)

2...Fins with spines.

a...Body uniformly covered with scales------(8)ACANTHOPTERI
(Sunfish & black bass)

b...Body without scales or irregularly scaled------(9)CATAPHRACTI
(Bullheads)

PART V

CHARACTERISTICS OF THE ORDERS FOUND IN MONTANA
(After S. H. Pratt)Order 1 CHONDROSTEI (Sturgeons)

Cartilaginous ganoids of large size, notochord persistent, branchiostegal rays weak, mouth ventral being beneath a long snout, body naked or with bony plates, tail heterocercal.

Order 2 ISOSPONDYLI (Herring, salmon, & trout)

Unmodified anterior vertebrae, lower pharyngeal arch simple not falciform, head not scaly, maxillary distinct from premaxillaries and forming part of margin of upper jaw, no barbels, air bladder if present with a pneumatic duct, fins without spines, ventral fins abdominal, scales usually cycloid (sometimes ctenoid) occasionally wanting.

Order 3 EVENTOGNATHI (Suckers, carps)

Anterior vertebrae modified with Weberian ossicles, fins soft-rayed being without spines, ventral fins abdominal, no adipose fin, lower pharyngeals falciform parallel with the gill arches, maxillaries perfect, jaws toothless, no pyloric caeca, air bladder with pneumatic duct.

Order 4 NEMATOGNATHI (Catfish)

Four anterior vertebrae modified and with Weberian ossicles, no subopercle, ventral fins abdominal, fins soft rayed except the dorsal and the pectoral fins, each of which has a single spine, scales wanting the skin being naked or with bony plates, the border of the mouth formed by the premaxillary with the maxillary being often rudimentary, barbels present on the maxillaries.

Order 5 THORACOSTEI (Sticklebacks)

Gills normal but with pharyngeals reduced in number, dorsal spines few or wanting, ventrals few, reduced or wanting, body more or less protected by bony plates, upper jaw formed by the premaxillaries.

Order 6 HAPLOMI (Pike, pickerels)

Soft rayed with anterior vertebrae distinct and without Weberian ossicles, no adipose fin, pseudobranchiae wanting or glandular, body covered with cycloid scales, ventral fins abdominal, head usually more or less scaly, air bladder with pneumatic duct.

Order 7 ANACANTHINI (Codfish)

Dorsal and anal fins very long and without spines, ventral fins jugular without spines, no pseudobranchiae.

Order 8 ACANTHOPTERI (Sunfish, bass)

Anterior vertebrae unmodified and without Weberian ossicles, ventral fins usually more or less anterior in position being either thoracic or juglar and possessing normally one spine and five soft rays, anterior rays of dorsal fins and also of anal fins spinous, scales typically ctenoid margin of mouth formed by the premaxillaries alone, air bladder typically without pneumatic duct in adult.

CHARACTERISTICS OF THE ORDERS

(Continued)

Order 9 CATAPHRACTI (Bullheads)

With a bony process of the suborbital ring extending across the cheek towards the preopercle.

Order 10 CYPRINODONTES (Killifish, Top minnows)

Small fish with moderately elongated bodies, flattened head and large cycloid scales, head more or less scaly, mouth small terminal with a projecting lower lip, upper jaw protractile its margins formed by the premaxillaries, branchiostegals 4 to 6, tail not forked, no pyloric caeca, no lateral line, many species ovoviviparous.

KEY TO THE FAMILIES OF FISHES FOUND IN MONTANA
(Modified from Jordan and Everman, and Pratt)

Note: Numeral before the family name is the number of the order to which it belongs, given in the preceeding key and characteristics of the orders. The number following the family name is the number of the family.

I...VENTRAL FINS ABDOMINAL

A... Back with an adipose fin behind single dorsal fin.

1...Head with 4 to 8 long barbels about the mouth and nostrils, body scaleless, a single spine in each pectoral and dorsal fin------(4) AMEIURIDAE, 2
(Catfish)

2...Head without barbels as above, no fin spines.

a...Dorsal fin long and high of about 24 rays, branchiostegals 6 to 10------(2) THYMALLIDAE, 8
(Grayling)

b...Dorsal fin moderate of fewer than 24 rays, branchiostegals 10 to 20.

*...Mouth small, upper jaw extending only to eye------(2) COREGONIDAE, 7
(Whitefish)

**...Mouth large, upper jaw extending to back of eye------(2) SALMONIDAE, 6
(Trout, salmon)

B...Back without adipose fin.

1...Tail heterocercal, body with 5 series of body shields------(1) ACIPENSERIDAE, 1
(Sturgeon)

2...Tail not heterocercal, body without shields.

a...No teeth in jaws, gill membranes broadly joined to the isthmus, head naked.

*...Body scaled, pubic bones not fused.

#...Lower pharyngeal teeth very numerous in one row like teeth on a comb------(3) CATOSTOMIDAE, 3
(Suckers)

##...Lower pharyngeal teeth fewer than 8 in 1 to 3 rows------(3) CYPRINIDAE, 4
(Chubs, minnows)

**...Body naked, pubic bones fused forming
a plate, five dorsal spines----- (5) GASTEROSTEIDAE, 12

b...Jaw teeth present, gill membranes free
from isthmus

*...Head more or less scaley, teeth coarse
and sharp.

#...Upper jaw formed by premaxillary,
anal fin of male long inserted
forwards----- (10) POECILLIIDAE, 11
(Top minnow)

##...Upper jaw formed by maxillaries,
anal fin normal.

'...Small fish with no lateral line----- (6) UMBRIDAE, 10
(Mud minnows)

"...Large fish with lateral line and
jaw depressed prolonged----- (6) ESOCIDAE, 9
(Pike)

**...Head naked, some of teeth canine, large
mouth----- (2) HIODONTIDAE, 5
(Moon eyes)

II...VENTRAL FINS THORACIC OR SUBJUGULAR

A...Body without scales, sometimes with prickles,
large pectoral fins----- (9) COTTIDAE, 16
(Bullheads)

B...Body evenly scaled, pectoral fins normal.

1...No barbels, dorsal fin of spinous and soft rays.

a...Lateral line extending on to tail fin----- (8) SCIAENIDAE, 15
(Drumfish)

b...Lateral line not extending on to tail fin.

*...Only one dorsal fin present, the
spinous and soft-rayed portions
joined----- (8) CENTRARCHIDAE, 13
(Sunfish, black bass)

**...Two dorsal fins present, spinous and
soft-rayed portions not joined----- (8) PERCIDAE, 14
(Perch)

2...Barbels present, dorsal fins of soft rays only----- (7) GADIDAE, 17
(Burbot, ling)

PART VII

KEY TO GENERA AND SPECIES OF FISHES FOUND IN MONTANA
(From various sources)

Family 1 Acipenseridae (Sturgeon)

Only one species found in Montana characterized by its bony plates instead of scales and by its heterocercal tail. Missouri River.

Scaphirhynchus platyrhynchus
(Shovel-nosed sturgeon)

Family 2 Ameiuridae (Catfish)

I...Adipose fin keel-like, adnate to the back and continuous with the caudal fin, only one species found in Montana.

Noturus flavus
(Stone cat, Little yellow cat)

II...Adipose fin with its posterior margin free.

A...Head heavy, anal fin rays 21 or 22, no spots on sides, only one species belonging to the genus found in Montana.

Ameiurus nebulosus
(Common bullhead, Horned pout)

B...Head small, narrow and concave above, anal fin rays 25 to 30, sides with blackfish dots. One species

Ictalurus punctatus
(Channel cat, Spotted cat)

Family 3 Catostomidae (Suckers)

I...Dorsal fin with 24 to 30 rays-----Carpoides

*I...lips full thick reddish
first ray of dorsal fin
twice or more as long as
the other rays, depth of
body less than 1/3 length-----C. velifer
(Quillback)

*II...lips not reddish, first
dorsal ray not as above,
depth of body 1/3 of length-----C. carpio
(Carp sucker)

II...Dorsal fin short with only 10 to 18 rays.

A...Lower fins not red, air bladder in two parts.

1...Lateral line complete, scales small, 55 to 115 scales in lateral line.

a...Jaws with hard sheaths, posterior border of air-bladder slender, unossified portion on top of head very small.

One species-----Pantosteus jordani
(Mountain sucker or Jordan's sucker)

KEY TO GENERA AND SPECIES (Cont.)

- b...Jaws without hard sheaths, posterior margin
of air bladder slender, unossified portion on
top of head-----Catostomus
- *I...upper lip broad with 5 to 6 rows of papillae
- *A...Upper lip not projecting, scales
small-----C. discobolus
- *B...upper lip long & pendant, scales
small-----C. griseus
(Platte River sucker)
- *II...upper lip comparatively narrow,
with 2 to 4 rows of papillae.
- *A...scales on lateral line 95 to 115-----C. catostomus
(Long-nosed sucker or
Mountain sucker)
- *B...scales 56 to 75 on lateral line,
scales small but larger than the
preceeding group and less crowded
anteriorly.
- *1...scales on lateral line 70 to 75,
lower lip broad, dorsal fin long
with about 15 rays-----C. Macrocheilus
(Columbia River sucker or
Yellow sucker)
- *2...scales on lateral line 58 to 70,
scales larger, lower lip with 4
rows of papillae, upper lip narrow
-----C. commersonii
(Common sucker or White sucker)
- 2...Lateral line interrupted, scales large with small
blackish spot at base of each scale. One species.
-----Minytrema melanops
(Spotted sucker)
- B...Lower fins always red in life, air-bladder in three
parts. One species-----Moxostoma aureolum
(Red-horse sucker or Mullet)

Catostomus ardens also probably present in the state.

PART VIII

CHARACTERISTICS OF THE FAMILIES AND SPECIES

Family 1 Acipenseridae (Sturgeon)

Large fish with 5 long rows of keeled bony plates on body, mouth ventral toothless with a long snout projecting in front, no branchiostegals, tail heterocercal.

(Shovel-nosed Sturgeon) Scaphirhynchus platyrhynchus: D32, A20 lateral shields 41 to 46, color pale yellowish olive, snout broad, average length, 2 ft. Missouri River.

Family 2 Ameiuridae (Catfish)

Body naked or covered with bony plates, head with 8 barbels, margin of upper jaw formed by the premaxillaries alone, opercle present but no sub opercle, a small fatty adipose fin back of dorsal, front ray of dorsal and ventral fins spinous.

(Stone Cat or Little Yellow Cat) Noturus Flavus: Body elongate, head depressed nearly as broad as long, adipose fin adnate to back, dorsal fin deeply notched, dorsal spine short, color uniform yellowish brown, fine edged with yellow, poison gland at base of pectoral spine. Missouri drainage.

(Common Bullhead or Horned Pout) Ameiurus Nebulosus: DI-7, A21 or 22, adipose fin free, head over 1/3 the length of the body, color dark yellowish brown clouded darker, sometimes almost black, usually not more than 1 ft. long. Planted in many of our more stagnant lakes.

(Channel Cat or Spotted Cat) Ictalurus punctatus: A25 to 30, head fairly small narrow barbels long, spines long, color olivaceous or blue above with white belly, sides with irregular small black spots. Missouri drainage.

Family 3 Catostomidae (Suckers)

Head naked without barbels, jaws toothless, mouth usually with thick fleshy protractile lips, sides of upper jaw formed by the maxillaries, lower pharyngeal bones with a single row of teeth, branchiostegals 3, gill membranes united to the isthmus, pseudobranchii present, air bladder large divided into 2 or 3 compartments, no adipose fin, ventral fins abdominal, no spines in fins.

(Quillback or Skimfish) Carpoides velifer: Lips full, thick, reddish in life, the halves of the lower lips meeting at an acute angle, first ray of the dorsal very long, opercles strongly striated. Common in the Missouri, Milk and Poplar Rivers.

(Carp Sucker) Carpoides carpio: D30, A7, lateral line scales 36, body compressed, muzzle short but projecting beyond mouth, anterior rays of dorsal short and thickened at base.

(Mountain or Jordans Sucker) Pantosteus jordani: Much like the rest of our common suckers but with a cartilaginous sheath on each jaw and with only a very small unossified spot on top of the head, scales small, color dark greenish with orange lateral band, D10 or 11, A7, S 16-90 to 100-14, mature length one foot. General in the Columbia and Missouri drainages.

Catostomidae (Cont.)

(Bigmouth) Catostomus discobolus: D12 to 13, A7, S 16 to 21-101 to 109-17 to 21, lips thick, the lower extending beneath the eye. Red Rock, Beaverhead Rivers etc.

(Platte River Sucker) Catostomus griseus: D10 to 12, S 16-90 to 100-14, head large flat, mouth large with upper lip large pendant, lower lip incised to base, color dusky brown, sometimes mottled or barred darker, length 1 to 2 ft. Upper Missouri, Yellowstone, Milk, Gardiner, Poplar, etc.

(Long-nosed or Northern Sucker) Catostomus catostomus: D10 or 11, A7, S 14 to 17-90 to 117-13, head long slender flattened above, snout overhanging large mouth, upper lip narrow with 2 to 3 rows of papillae, lower lip incised, scales small crowded anteriorly. Upper Missouri and Columbia drainages.

(Columbia River or Yellow Sucker) Catostomus macrocheilus: D12, to 14 A7, S 12 to 14-65 to 75-10 to 11, body heavy forward, snout slung over mouth, upper lip pendant with 6 to 8 rows of papillae, dorsal fin longer than high, color dark with dusky lateral streak, pale below. Columbia drainages.

(Common, June or White Sucker) Catostomus commersonii: D12, A7, S 10-64 to 70-9, snout prominent but barely overhanging mouth, 2 to 3 rows of papillae on the upper lip, scales small crowded anteriorly, color olivaceous, males in spring rosy. General.

(Spotted Sucker) Minytrema melanops: Incomplete lateral line, D12 to 14, A7 small black spot at the base of each scale on the sides being the only sucker with this, grows as large as two feet. Missouri drainage.

(Red-horse Sucker or Mullet) Moxostoma aureolum: D12 to 14, S 5-41 to 45-5 to 7, lips plicate, muzzle projecting beyond mouth, color olivaceous with silvery sides, lower fins red or orange, grows to 2 ft. Missouri drainage.

KEY TO GENERAL AND SPECIES

(continued)

FAMILY 4: CYPRINIDAE (Carps, minnows, dace)

Small or medium sized fish with elongate body covered with cycloid scales and with naked head, margins of upper jaw formed by the premaxillaries alone, jaws toothless, the two paired lower pharyngeal bones parallel with the gill arches each being falciform in shape and bearing 1 or 2 rows of teeth on each side, there being 4, 5 or 6 teeth in the main or hindermost row and 1 or 2 teeth in the other row if present, branchiostegals 3, gills 4, fins typically spineless, ventral fin abdominal in position, air bladder large, usually with two compartments, stomach only an enlargement of the intestine, no pyloric caeca present.

Only the genera are keyed out here. To determine the species, see the descriptions.

I...Digestive canal more than twice the length of the body, peritoneum usually black.

A..First ray of dorsal fin separate and joined to the rest of the rays by a membrane, lateral line incomplete-----Pimephales

B..First ray of dorsal fin normal, lateral line complete-----Hybognathus

II..Digestive canal short, less than twice the length of the body, peritoneum usually pale.

A..Teeth blunt and enlarged, only slightly enlarged, all large fish growing up to one foot.

1..No barbels present, (teeth sharp in young)-----Clarkina

2..Small barbel present on maxillary-----Mylocheilus

B..Teeth slender hooked, mostly small fish.

1..Teeth in main row 5-5 or 4-5

a..Abdomen behind ventral fins compressed to an acute angle which is scaleless-----Notemigonus

b..Abdomen behind ventral fins rounded and scaled

a1..Size large, up to 40 inches-----Ptychocheilus

a2..Length not over 16 inches

b1..Lateral line complete

c1..Anal fin with 9 to 22 rays, fins high

d1..Chrome yellow crescent from angle of mouth to back of eye-----Richardsonius

d2..Without yellow crescent on cheek-----Cheonda

c2..Anal fin with 7 or 8 rays, fins low-----Tigoma

KEY TO GENERA AND SPECIES (Cont.)

Family 4: Cyprinidae (Cont.)

b2...Lateral line incomplete-----Hemitremia

2...Teeth in main row 4-4, the lesser row being absent.

a...No barbels present.

a1...Teeth in 1 or 2 rows, 4 being in the main row &
1 or none in the short row on each or both sides---Hybopsis

a2...Teeth in 2 rows being 2, 4-4, 2 or rarely 1,
(very small fish)-----Notropis

b...Barbels present.

a1...Scales very small 60 to 90 in lateral line.

b1...Premaxillaries not protractile-----Rhinichthys

b2..Premaxillaries protractile.

c1...Barbles minute-----Apocope

c2...Barbels well developed-----Couesuis

a2...Scales large 35 to 50 in lateral line.

b1...Size large, being 10 inches or more in length,
(head small & broadly depressed)-----Platygobio

b2...Size small not being much larger than
2 inches in length-----Macrhybopsis

KEY TO GENERA AND SPECIES (Cont.)

FAMILY 5: Hiodontidae (Mooneyes)

Body oblong compressed, covered with silvery cycloid scales, mouth terminal oblique, tail forked, branchiostegals 8 to 10, teeth on jaws, tongue vomer sphenoid hyoid pterygoid & palatines, eyes large, no pseudobranchiae, one pyloric caeca, dorsal fin rather posterior, anal fin elongate low, caudal strongly forked, no adipose fin, 12 rays in dorsal fin, of one genus, and 9 rays in the other.

- I...Dorsal fin with 9 developed rays, belly keeled in front of ventrals (anal fin with 32 rays, scales 6-56-7, maxillary reaching beyond the middle of the eye, color bluish above, sides silvery with golden lustre) ----- Amphiodon alosoides
(Gold eyes, La Queche)
- II...Dorsal fin with 11 or 12 developed rays, belly in front of ventrals not keeled, (anal fin with 28 rays, scales 5-55-7, eye large, the maxillary barely reaching the middle of the eye, color brilliantly silvery, olive shaded above) ----- Hiodon tergisus
(Mooneye, Toothed Herring)

KEY TO GENERA AND SPECIES (Cont.)

Family 6: Salmonidae

(Mouth deeply cleft, the long lower jaw articulating with the quadrate bone behind the eye, dentation strong complete, conical teeth on the jaws vomer & palatines, tongue with two series of strong teeth, scales comparatively small.)

I..Anal fin elongate of 14 to 17 rays-----Oncorhynchus

*I..Gillrakers few short 20 to 25

*A..large, oblong spots on tail,
scales small about 200 in
lateral line-----

O. gorbuscha
(pink salmon, Humpback salmon)

*B..no large oblong spots on tail,
scales larger 125 to 155
in lateral line.

*1..scales medium 138 to 155
in lateral line, pyloric
caeca about 150.

*a..dorsal fin with 9 rays,
branchiostegals 13 or
14, anal rays 13 or 14,
black spots small or
obsolete-----

O. keta
(Dog salmon, chum)

*b..dorsal fin with 11 rays
branchiostegals 15 to 19,
anal rays about 16, back
& upper fins with round
black spots-----

O. tshawytscha
(Chinook salmon, King salmon,
Spring salmon, Quinnet, etc.)

*2..scales comparatively large about
127 in lateral line, pyloric caeca
50 to 80, (rays of dorsal fin 10,
branchiostegals 13 or 14-----

O. kisutch
(Silver salmon, Coho)

**II..gillrakers comparatively large &
numerous 30 to 40 in number, (scales
large about 130 in the lateral line,
back of adult usually unspotted clear
blue in spring and red in fall, young
spotted.)

*A..large anadromous fishes about
6 lbs. when mature-----

O. nerka
(Sockeye salmon, Red salmon, Blueback)

*B..mature fishes less than half
the size of O. nerka, probably
a land-locked form of the same,
at least land-locked in a physio-
logical sense-----

O. nerka kennerlyi
(Sockeye salmon, Little red salmon,
Yank, Walla Kennerleys salmon)

KEY TO GENERA AND SPECIES (Cont.)

Family 6: Salmonidae (Cont.)

II...Anal fin short of 9 to 12 developed rays.

A..Red gray or yellow markings or spots, vomer bone boat-shaped the shaft strongly depressed and without teeth.

1..Body spotted gray or yellow, tail strongly forked, vomer with raised crest with strong teeth extending backward from head of the bone, hyoid bone with a broad band of strong teeth, scales 180 to 205 in the lateral line, (upper body with dusky or yellowish markings, under fins often touched with a yellow crest.) One species-----

-----Cristivomer namacush
(Lake trout, Mackinaw trout, Salmon trout, Lunge, etc.)

2..Body with red spots, lower fins with white edgings, tail square, vomer without raised crest, hyoid bone with weak teeth or none, scales small persistent 215 to 250 in lateral line-----

-----Salvelinus

*I..head and back marbled with dark olive or black, red spots on sides with purplish or bluish rings, (body deep not rounded, back unspotted-----

-----S. fontinalis
(Eastern brook trout)

*II..no marbled markings, red spots when present without bluish ring.

*A..yellow or reddish spots (no marbling) on sides and back and read, generally with bright red spots on side without blue ring, head large flattened on top, body round, under-fins edged in white-----

-----S. malma spectabilis
(Dolly Varden trout, Bull trout, Western charr)

*B..back without spotting, no red spots, a few of the yellow spots on the sides extending above the lateral line but very few, head small, golden sheen on the scales, belly of the male with orange and under fins with considerable white in breeding season-----

-----S. aureolus
(Sunapee trout, American Saibling)

KEY TO GENERA AND SPECIES (Cont.)

Family 6: Salmonidae (Cont.)

B..Spots principally dark on a light background, vomer flat, its toothed surface plane, teeth on shaft of vomer in alternating rows or in one zigzag row and placed directly on the surface of the bone not on a free crest-----

Salmo

*I..vomerine teeth not numerous and often deciduous, outer or first rays of the ventral and anal fins not definitely white, x-shaped or irregular black spots on body and generally several large spots on side of head, (sides silvery, breeding males often with yellowish markings on tail, scales 112 to 118 on lateral line.)-----

S. sebago

(Land-locked salmon, Sebago salmon)

*II..vomerine teeth numerous persistent, usually outer or first rays of the ventral and anal fins definitely with some white and usually spots not X-shaped or irregular in shape.

*A..general color brownish yellow, lower fins pale yellow to white, sides usually with a few red spots.

*1..body slender greatest depth being $4\frac{1}{2}$ length of body less tail
adipose fin small with width $\frac{1}{2}$
its length, head $\frac{2}{9}$ to $\frac{1}{5}$ length
of body less tail, spots often with
light border or ring-----

S. trutta leveninsis
(Loch Leven trout)

*2..body short deep greatest depth 4
in length of body less tail, adipose
fin long expanded at its end, head
 $\frac{1}{4}$ of body length less tail, generally
with red spots mixed with black, young
with red spots in bluish circle-----

S. trutta fario
(Brown trout, Von Behr trout)

*B..general color not brownish.

*1..scales moderate to large 120 to 180 in lateral line, usually no red on throat, (red stripes on sides of body and gill covers in spawning males, usually many black spots on background of lighter color, lower fins light in color.)

*a..scales moderate 130 to 180 on the lateral line, (no red on throat, a reddish lateral band usually present, mouth moderate, maxillary half length of head, hyoid teeth wanting, size large, vertebrae 60-----

S. gairdneri

*b..scales typically large 120 to 145 in lateral line, (usually no red on throat, a red or yellowish lateral band, mouth small, maxillary 2 or $2\frac{1}{2}$ in head, hyoid teeth wanting, size smaller.

KEY TO GENERA AND SPECIES

Family 6: Salmonidae (Cont.)

- *a2..scales decidedly large 120 to 135
in lateral line, body elongate, no
red on throat, mostly of small size,
brook forms, probably only a sub-
species of the anadromous steel-
head-----S. gairdneri irideus
(Rainbow Trout)
- b2..scales medium 135 to 145 in lateral
line, (body rather deep, a small
dash of red usually present on the
throat, size medium, not anadromous,
much red or rosey on cheek and opercle,
belly partly red in males, side with
red lateral band broad and more or
less interrupted. It is the rainbow
of the fish-culturists and its crossing
with the cutthroat leads to much con-
fusion in the identification between
the rainbow and cutthroat series.)
Vertebrae 63-----S. shasta
(McCloud River Rainbow Trout)
- *2..scales always small 160 to 170 on the
lateral line, a red dash of color always
present on throat, (often heavily spotted
with black on background of lighter color,
no red spots on side of body, red stripe
on side of male often present.)
- *a..black spots encroaching somewhat on
belly-----S. clarkii clarkii
(Cutthroat trout, Black-spotted trout)
- *b..black spots not encroaching on the
belly-----S. clarkii lewisii
(Yellowstone trout)

KEY TO GENERA AND SPECIES (Cont.)

Family 7: Coregonidae (Whitefish)

(Mouth usually small the maxillary extending to a point in front of or beneath the anterior border of the eye, dentation feeble, our species with lower jaw shorter than the upper, premaxillaries broad with the cutting edge vertical or directed backwards.)

- I..Gillrakers long and slender with 17 to 20 on lower limb,
(length 600 m.m. or more, greatest weight about 25 lbs.,
color olive above sides white, rays of dorsal fin II,
anal fin rays II, scales of lateral line 72 to 86, branch-
iostegals 9 to 10, imported into our region and not our
common whitefish-----Coregonus culpeaformis
(Common Great Lakes Whitefish)
- II..Gillrakers short with 12 to 16 on lower limb. (Jordan
and Evermann recognize three native sub-species in
Montana more by geographical distribution than by
structural differences.)
- 1..From the Chief Mountain Lake, Mont. and in
the headwaters of the Saskatchewan elsewhere-----(Prosopium)
Coregonus couesi
(Saskatchewan Whitefish)
- 2..From the headwaters of the Missouri-----(Prosopium)
Coregonus
williamsoni
cismontanus
(Yellowstone Whitefish)
- 3..From the headwaters of the Columbia-----(Prosopium)
Coregonus
williamsoni
williamsoni
(Rocky Mountain Whitefish)

Family 8: Thymallidae (Grayling)

(Body elongate compressed slender, head short, mouth terminal, maxillary extending to a point below the middle of the eye, tail forked, dorsal fin long and high, adipose fin present, scales small loose. One species in Montana.

Thymallus montanus
(Montana Grayling)

Family 9: Esocidae (Pike)

(Body elongate slender, head naked above more or less scaled on sides, no pyloric caeca, branchiostegals 14 to 16, scales small, lateral line weak, teeth strong, tail forked, dorsal fin opposite the anal and near the tail. One species found in Montana which has whitish or yellowish spots arranged in rows on the sides.

Esox lucius
(Common Pike)

KEY TO GENERA AND SPECIES (Cont.)

Family 10: Umbridae (Mud Minnows)

(Body elleptical broad anteriorly and compressed posteriorly, teeth well developed and on premaxillary vomer and with palatines and maxillaries toothless, no lateral line, no pyloric caeca, dorsal fin somewhat posterior in position, scales large, branchiostegals 6 or 8, tail fin rounded, (length 100 m.m. color olive green with 14 narrow irregular pale transverse dark bars, dorsal fin rays 14, anal fin rays 8, scales 35 on the lateral line. One species rather doubtful if found in Montana.)

Umbra limi

(Mud minnow)

Family 11: Poeciliidae (Top Minnow)

(Small viviparous fish with the males anal fin modified to form an intromittant organ, body elongate, mouth small, scales large, ventral fins near pectorals, dorsal fin behind the anal. Introduced as a destroyer of mosquitoes. One species.)

Gambusia patruellis

(Top minnow, Mosquito fish)

Family 12: Gasterosteidae (Stickleback)

(Body elliptical rather slender compressed, caudal peduncle slender, tail fin small, no true scales present, ventral fins subabdominal in position consisting of one spine and 1 or 2 rays, middle and sides of body protected by the pubic bones. Our species with 5 prominent dorsal spines, length 65 m. m., color of males black tinged with red anteriorly, females olivaceous mottled with black.)

Eucalia inconstans

(Brook Stickleback)

Family 13: Centrarchidae (Sunfish & Blackbass)

(Body compressed shortened, mouth terminal, teeth villiform bands on the jaws, vomer and often on the palatines tongue and hyoids, premaxillaries protractile, maxillaries usually with a supplementary bone, one dorsal fin present with 6 to 13 spines, 6 to 10 pyloric caeca.)

- I..Anal fin almost as long as the dorsal, (dorsal fin spines 7 or 8, color silvery olive mottled with green or blackish-----Promoxis sparoides
(Calico Bass)

- II..Anal fin much shorter than dorsal.

- A..Spinous and soft-rayed portions of dorsal fin separated by a deep notch, depth of body about 1/3 the length of the body-

Micropterus

- *I..mouth moderate, the maxillary in adult not extending beyond eye, scales small about 17 rows on cheek, young more or less barred or spotted, never with a black lateral band-----

M. dolomieu

(Small-mouthed Bass)

KEY TO GENERA AND SPECIES

(Continued)

Family 13: Centrarchidae
(cont.)

- *II..mouth very large, the maxillary
extending beyond eye, scales rather
large about 10 rows on cheek, *Huro Horidana*
young with blackish lateral band-----*M. salmoides*
(Large-mouthed Black Bass,
Straw Bass)

B..Spinous and soft rayed portions of dorsal fin not separated
by a deep notched portion, depth of body usually more than
 $\frac{2}{3}$ length of body

- 1..Lower pharyngeal bones broad with blunt teeth,
(lower posterior border of opercular flap scarlet,
color greenish olive above, belly orange yellow, rays
of dorsal fin with 10 spinous rays and 10 to 12 soft
rays)-----*Eupomotis gibbosus*
(Common Sunfish, Pumpkin Seed)

- 2..Lower pharyngeals narrow with sharp teeth, gill-rakers
long, (palatines without teeth, pectoral fins pointed,
color olive green above belly yellow or brown, sides
with greenish cross bars, no blue stripes on cheeks or
red on fins, dorsal fin with 10 spiny rays and 11 or 12
soft rays.)-----*Helioperca incisor*
(Bluegill)

Family 14: Percidae (Perch)

(Body elongate or elliptical, scales ctenoid small, mouth
terminal or inferior, opercle ending in a flat spine,
branchiostegals 7, two dorsal fins present, the anterior one
with about 13 spines, ventral fins thoracic.)

- I...Canine teeth on jaws and palatines, body elongate, (pyloric
caeca 4 to 8 of unequal length, color olive gray, sides
brassy or orange with dark mottlings, spinous dorsal fin
with 3 irregular rows of dark spots, dorsal fin with 11 to
15 spinous rays and 18 soft rays.)-----*(Stizostedion)*
Cynoperca canadensis
(Saugar, Sand Pike)

- II..No canine teeth, body elliptical compressed, (cheek scaly,
opercle mostly naked and armed with a single spine,
preopercle serrated, mouth terminal, branchiostegals 7,
pyloric caeca 3.)-----*Perca flavescens*
(Yellow Perch, Ring Perch,
Common Perch)

KEY TO GENERA AND SPECIES
(Continued)

Family 15: Sciaenidae (drumfish)

(Body compressed more or less elongate and back elevated, scales ctenoid, lateral line extending on to tail fin, premaxillaries protractile, dorsal fin single deeply notched, air bladder large and complex enabling the fish to make a drumming sound, no teeth on palatines vomer pterygoids or tongue, branchiostegals 7, color grayish silvery with dusky streaks along the rows of scales, length up to 44 in., weight up to 50 lbs., dorsal fin with 9 spiny rays in first half of fin and 1 spiny ray and 25 to 30 soft rays, anal fin with 7 rays, scale series 9-55-13, head scaly, one species in Montana.)

Aplodinotus grunniens
(Sheephead, Fresh-water Drumfish)

Family 16: Cottidae (Bullheads)

(Body elongate, tapering backward from the broad head, body smooth sometimes with prickles, preopercle with a spine at its angle and usually 2 or 3 spines below it, villiform teeth on the vomer jaws and sometimes on the palatines, gill openings separated by a wide isthmus, pectoral fins large, dorsal fins usually nearly or quite separate, ventral fins thoracic.)

Cottus

*I..palatine bones with
teeth, the two dorsal
fins usually very slightly
connected at base or not at
all.

*A. found in the Rocky Mt.
regions.

*1. color olivaceous spotted
with black and with 5 and
6 dark lateral cross bars,
dorsal fin with 7 or 8
spiny rays and 17 or 18
soft rays, anal fin with
11 or 12 rays, length
about 5 in.

C. punctulatus
(Millers Thumb, Bullhead, Blob)

*2. color gray with
inconspicuous bars on
the sides, rays of the
dorsal fin with 7 spiny
rays, anal rays 12 or 13,
length 4 inches.

C. Semiscaber
(Rocky Mountain Bullhead)

KEY TO THE GENERA AND SPECIES

(continued)

Family 16: Cottidae
(cont.)

- *B..found east of the Rockies
and in Yellowstone Park,
(color olivaceous barred
or speckled with darker,
dorsal fin with 6 to 8
spiny rays and 16 to 17 soft
rays, anal fin with about 12
rays, length about 6 inches.

C. bairdi
(Millers Thumb)

- *II..palatines without teeth,
(color mottled black and
white with 6 blackish cross
bars on back, the first
across the head behind the
eyes, dorsal fin with 6 to 8
spiny rays and 15 to 18 soft
rays, anal fin with 11 to 13
rays, length about 4 inches.

C. beldingi
Bullhead)

Family 17: Gadidae (Burbot or Ling)

(Body long and low and depressed in front and compressed
behind, anterior nostrils each with a short barbel, chin
with a long barbel, two dorsal fins present, the first
short and the second very long, the caudal fin rounded, scales
small imbedded length 1 to 3 feet, color dark olive marbled
with blackish, dorsal fin with 13 to 76 soft rays in the
anterior and posterior portions respectively, anal fin with
68 rays. One species in Montana.

Lota maculosa
(Burbot, Ling, Lawyer)