THE PARASITE FAUNA OF PINK SALMON, *ONCORHYNCHUS GORBUSCHA* (WALBAUM, 1792), IN RIVERS DRAINING TO THE WHITE AND BARENTS SEAS

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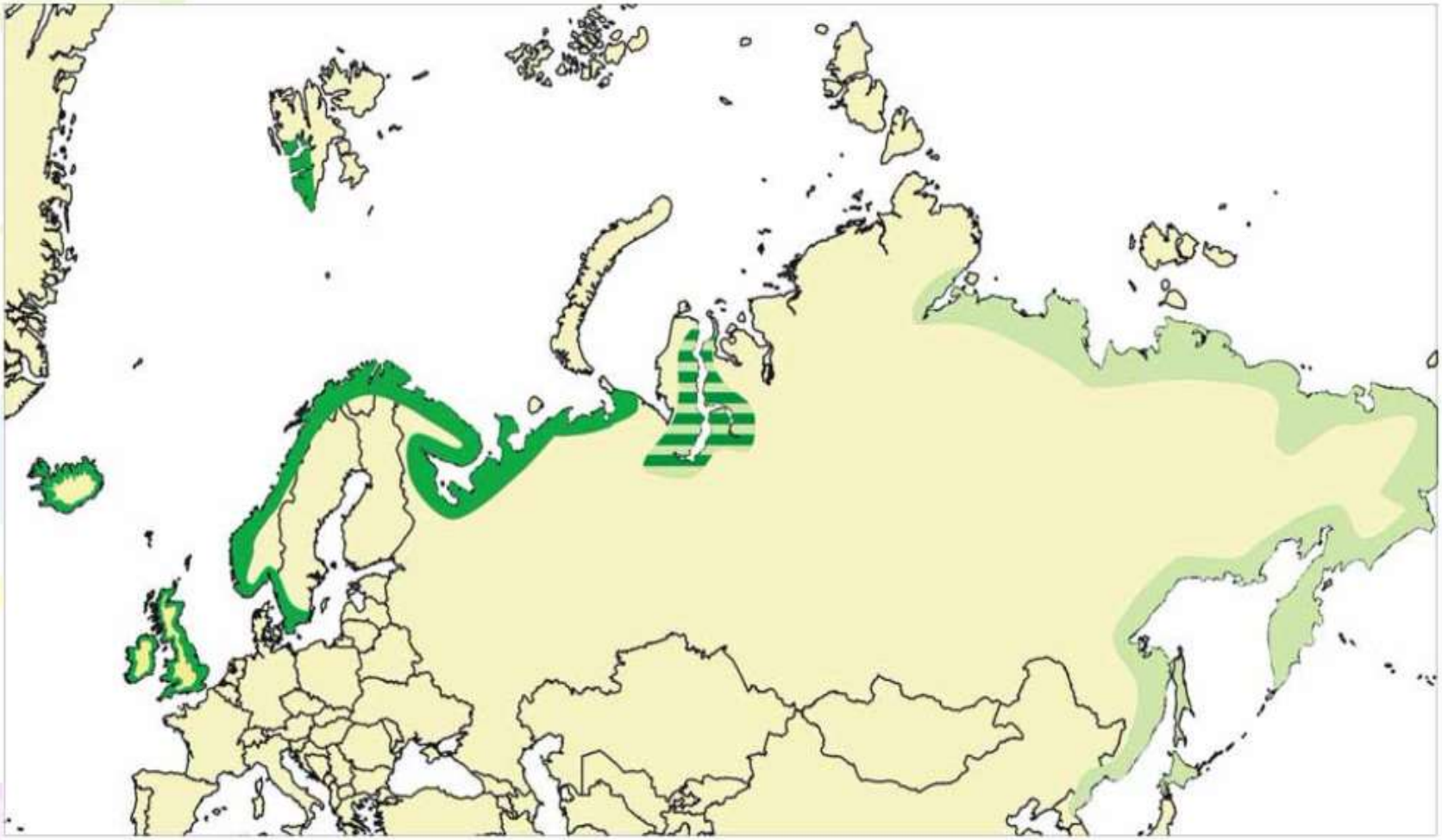
The distribution of pink salmon in Europe and Asia



Introduction

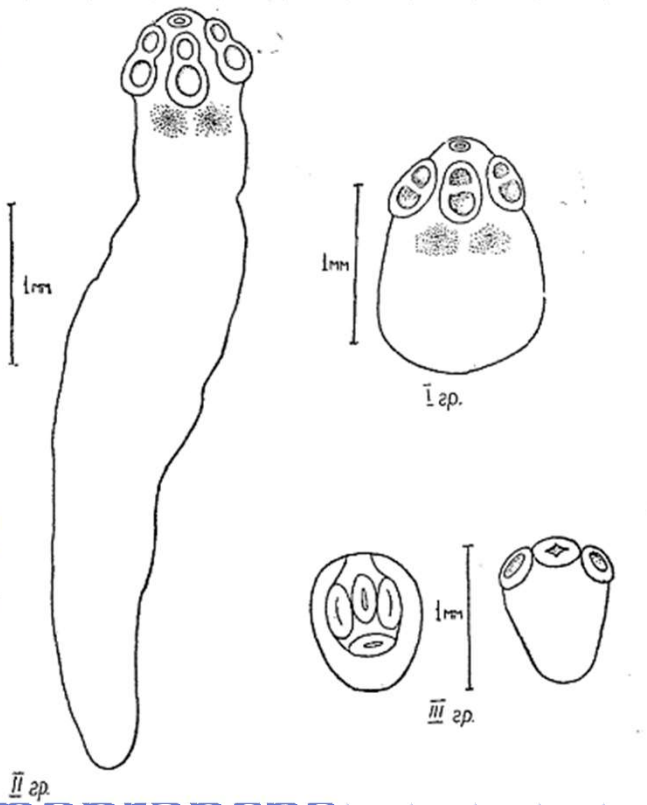
- First data on parasites of the pink salmon acclimated in the Barents and White Sea drainage basins were gathered in the 1960s (Nienburg, 1963; Malakhova, 1972; Grozdilova, 1974;).
- A comparative analysis of the parasite species diversity in pink salmon and native salmonid species spawning in rivers across the Kola Peninsula was carried out by Mitenev (1993).
- Monitoring of pink salmon in the Keret' River has enabled an assessment of changes in its parasite fauna over a prolonged period (more than 40 years) since introduction (Barskaya et. al., 2005).

The parasite fauna of the pink salmon

- In rivers of the Kola Peninsula and Karelia the parasite fauna is made up of 27 species
- The richness of the parasite community varies among rivers from 8 to 14 species
- All the parasites, with the exception of several species that infest pink salmon during the spawning run, represent the marine fauna.
- The dominant species are:
  - larval cestodes *Scolex pleuronectis*
  - adult trematodes *Derogenes varicus*, *Brachyphallus crenatus*, *Lecithaster gibbosus*
  - juvenile nematodes *Hysterothylacium gadi aduncum*

Scolex pleuronectis

- *S. pleuronectis* is the pro
cestode larvae group of
Phyllobothriidea.
- Intermediate hosts of th
lower crustaceans;
- *The larvae S. pleuronect*
around the Globe, and in
bony fish species
- Definitive hosts are elasmobranchs –
sharks and rays, skates, and sawfish



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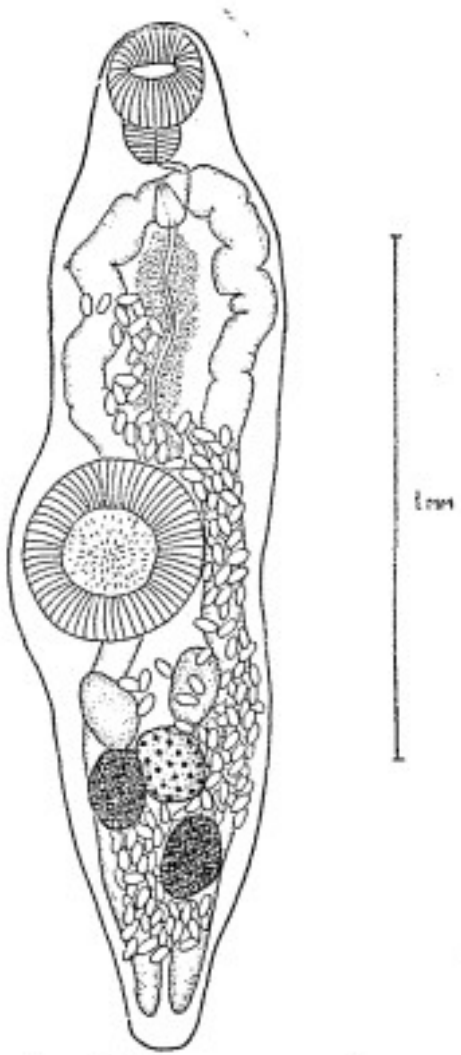


Рис. 2. Derogenes varicus

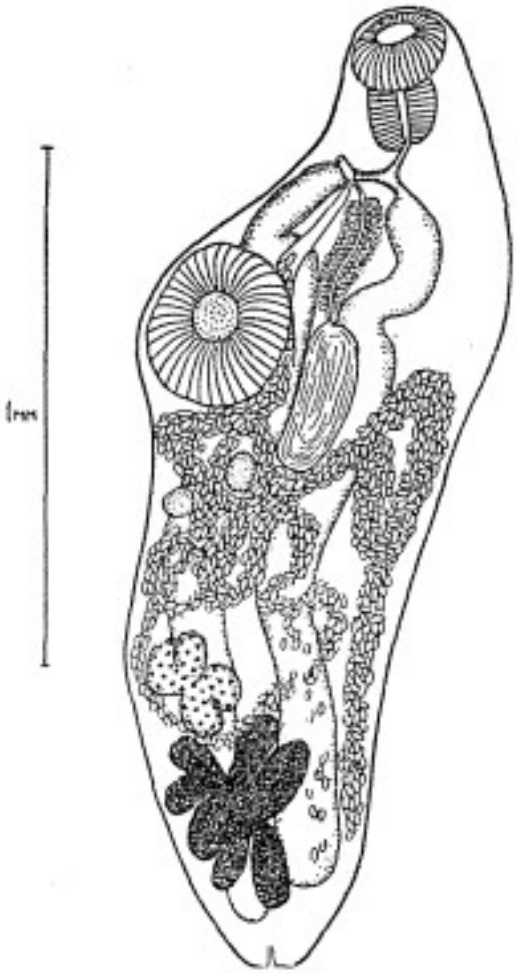
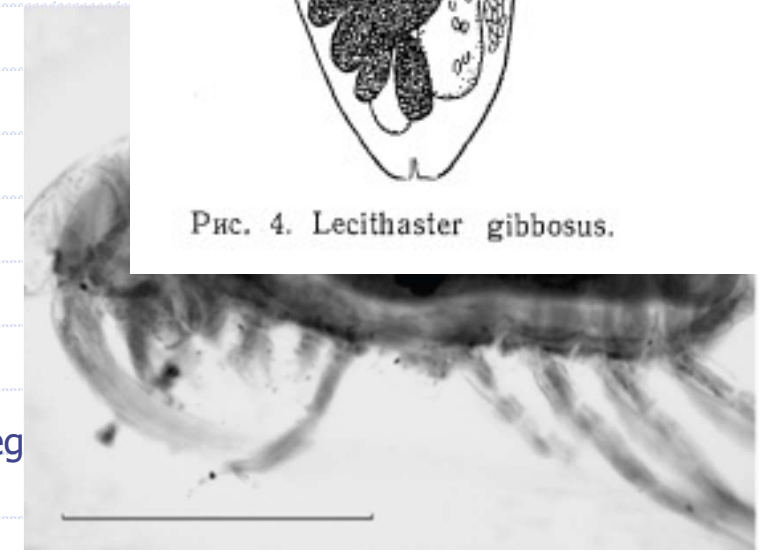


Рис. 4. Lecithaster gibbosus.



Juvenile nematodes *Hysterothylacium gadi aduncum*

- the life cycle of the parasite in marine ecosystems involves small crustaceans (as first level intermediate hosts),
- the second level is large invertebrates and many fish species (as paratenic hosts)
- carnivorous fish as the definitive host

Hysterothylacium gadi aduncum

- This species considered non-pathogenic or slightly pathogenic in larger fish, and it is common to find numerous nematodes in a single adult host (Hamre and Karlsbakk, 2002)
- fish larvae seem to be more severely affected by the nematode infection (Rosenthal, 1967; Bristow, 1990; Balbuena et al,. 2000; Karlsbakk et al., 2001)

Salmon louse, *Lepeophtheirus*

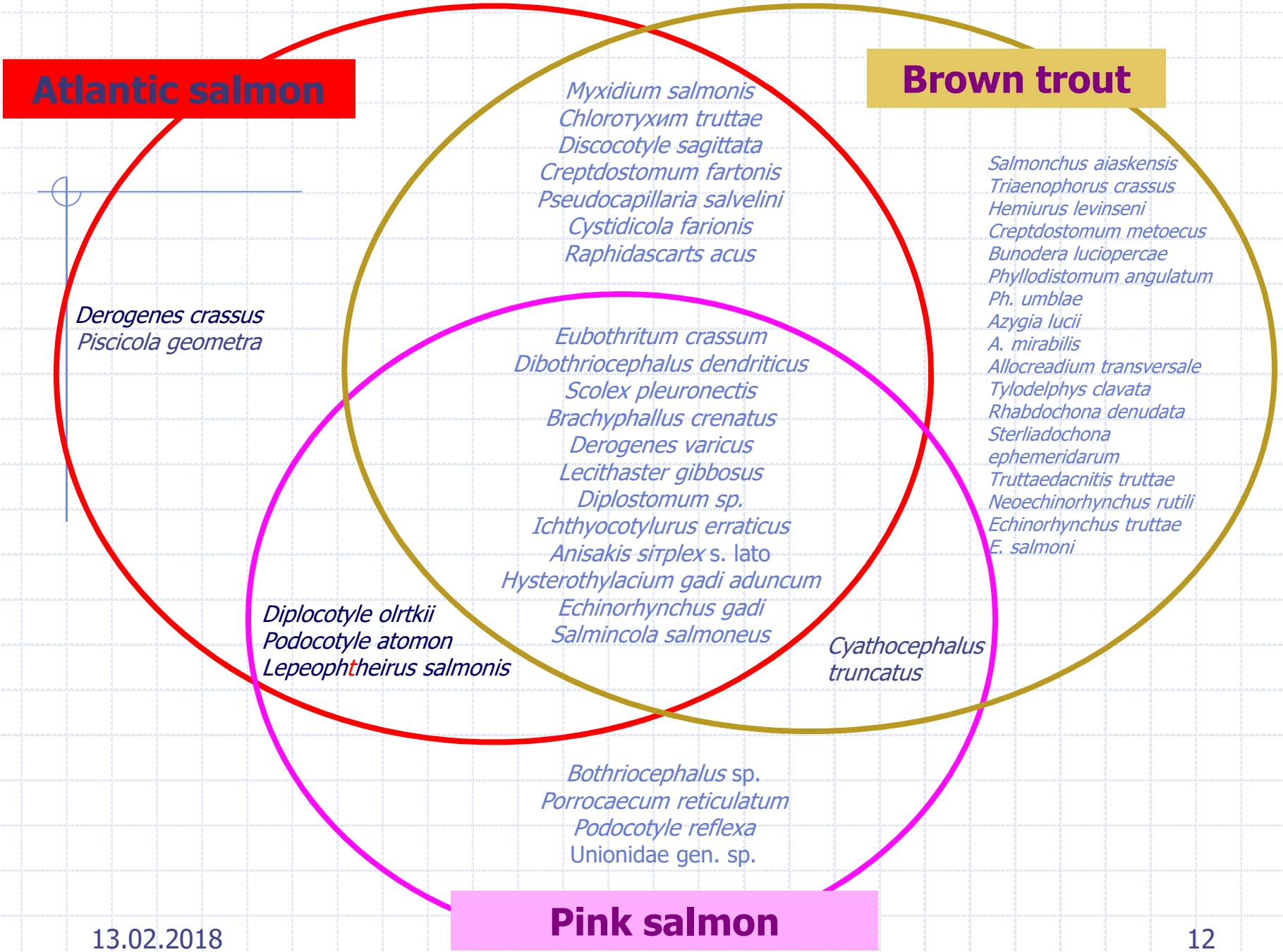
- *Lepeoptheirus s*
both in the Bare
- Infection levels in Pacific salmons (pink, chum and sockeye) correlate with their abundances.
- The pink salmon is the most heavily infected (43.0-62.5%), followed by the chum (21.0-32.2%) and sockeye (3.1-10.0%) (Bugaev, 2009).

Features of the parasite fauna in the pink salmon

- In terms of host-specificity, pink salmon parasites fall into two groups.
- The first one is generalists (using fish of various families as hosts). This group includes *Derogenes varicus, Brachyphallus crenatus, Lecithaster gibbos*us and other trematodes, *Scolex pleuronectis*, *Hysterothylacium gadi aduncum*.
- The second group comprises specialist parasites of the fish family Salmonidae: *Eubothrium crassum*, *Salmincola salmoneus*.

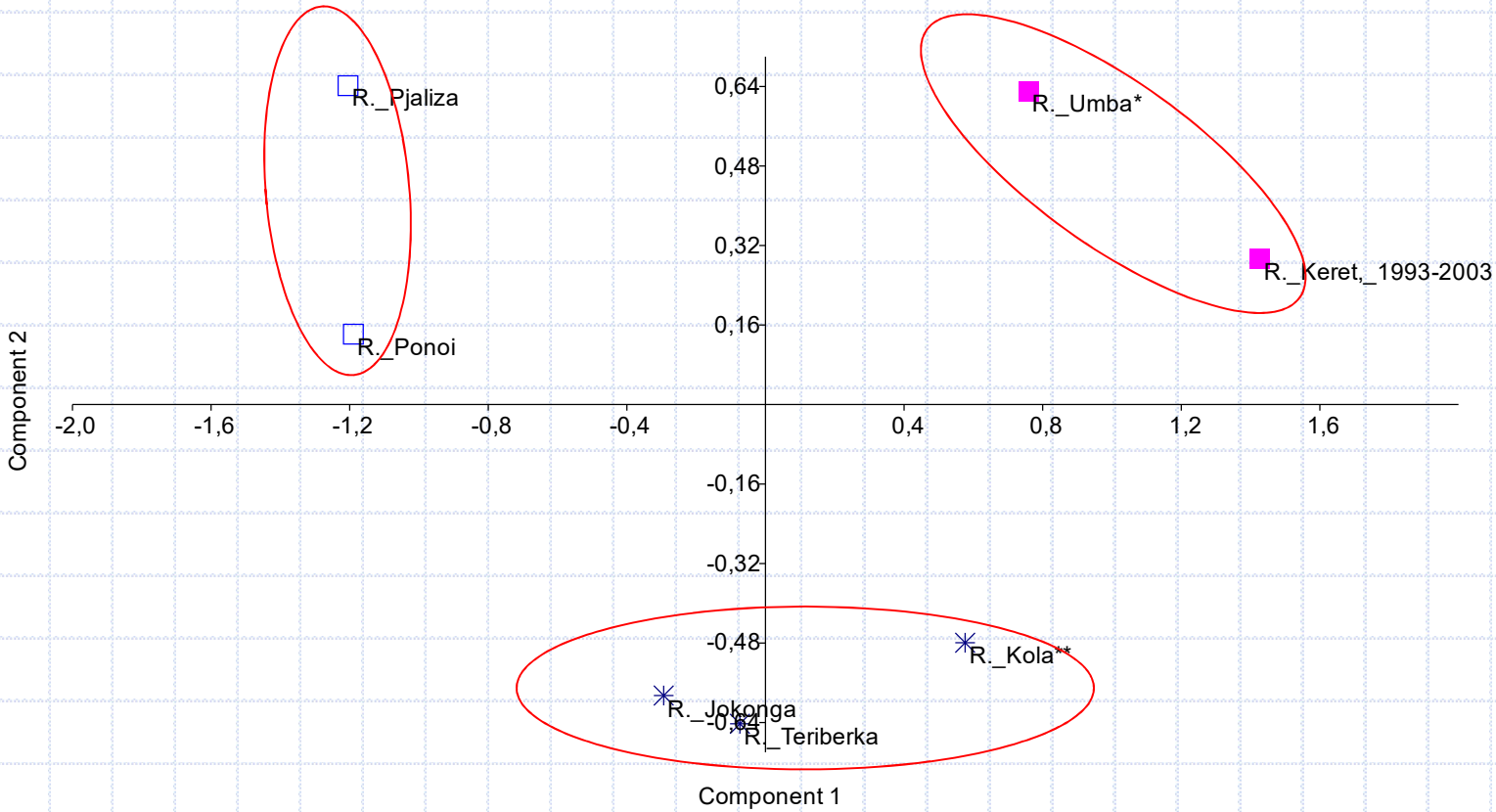
Features of the parasite fauna in the pink salmon

- The first group (generalists) prevails in the pink salmon. A majority of parasites in pinks is species typical of planktivorous pelagic fish.
- Parasites pertinent to littoral and benthos-feeding fish are rare.
  - The only species to be highlighted among them is *Echinorhynchus gadi* – acanthocephalan occurring in many fish species in the Barents and White Seas.
  - The pink salmon now hosts a typical parasite of littoral fish, the trematode *Podocotyle atomon*, which is widespread in fish in the Barents and White Seas.


Atlantic salmon
Brown trout
Pink salmon
Myxidium salmonis
Chlorotyxum truttae
Discocotyle sagittata
Creptdostomum fartonis
Pseudocapillaria salvelini
Cystidicola farionis
Raphidascarts acus
Salmonchus aiaskensis
Triaenophorus crassus
Hemiurus levinseni
Creptdostomum metoecus
Bunodera luciopercae
Phyllodistomum angulatum
Ph. umblae
Azygia lucii
A. mirabilis
Allocreadium transversale
Tylodelphys clavata
Rhabdochona denudata
Sterliadochona ephemeridarum
Truttaedacnitis truttae
Neoechinorhynchus rutili
Echinorhynchus truttae
E. salmoni
Derogenes crassus
Piscicola geometra
Eubothritum crassum
Dibothriocephalus dendriticus
Scolex pleuronectis
Brachyphallus crenatus
Derogenes varicus
Lecithaster gibbosus
Diplostomum sp.
Ichthyocotylurus erraticus
Anisakis simplex s. lato
Hysterothylacium gadi aduncum
Echinorhynchus gadi
Salmincola salmoneus
Diplocotyle olrtkii
Podocotyle atomon
Lepeophtheirus salmonis
Cyathocephalus truncatus
Bothriocephalus sp.
Porrocaecum reticulatum
Podocotyle reflexa
Unionidae gen. sp.

Features of the parasite fauna in the pink salmon

- The species richness of the parasite fauna of the pink salmon arriving to spawn in various rivers of the White and Barents Seas is not very high (8 -14 species)
- One of the explanations is the scarcity of studies of the parasite fauna in the pink salmon captured in river mouths, given the short time that the fish spend in brackish-water sites
- The data available on the species richness and diversity of pink salmon parasites in individual rivers demonstrate the specificity of the parasite fauna. Each of the surveyed pink salmon populations featured a parasite fauna distinct from that in the neighbor rivers. This specificity was associated with the pink salmon's foraging areas.


R._Pjaliza
R._Ponoi
R._Umba*
R._Keret,_1993-2003
R._Kola**
R._Jokonga
R._Teriberka
0,64
0,48
0,32
0,16
-0,16
-0,32
-0,48
-0,64
-2,0
-1,6
-1,2
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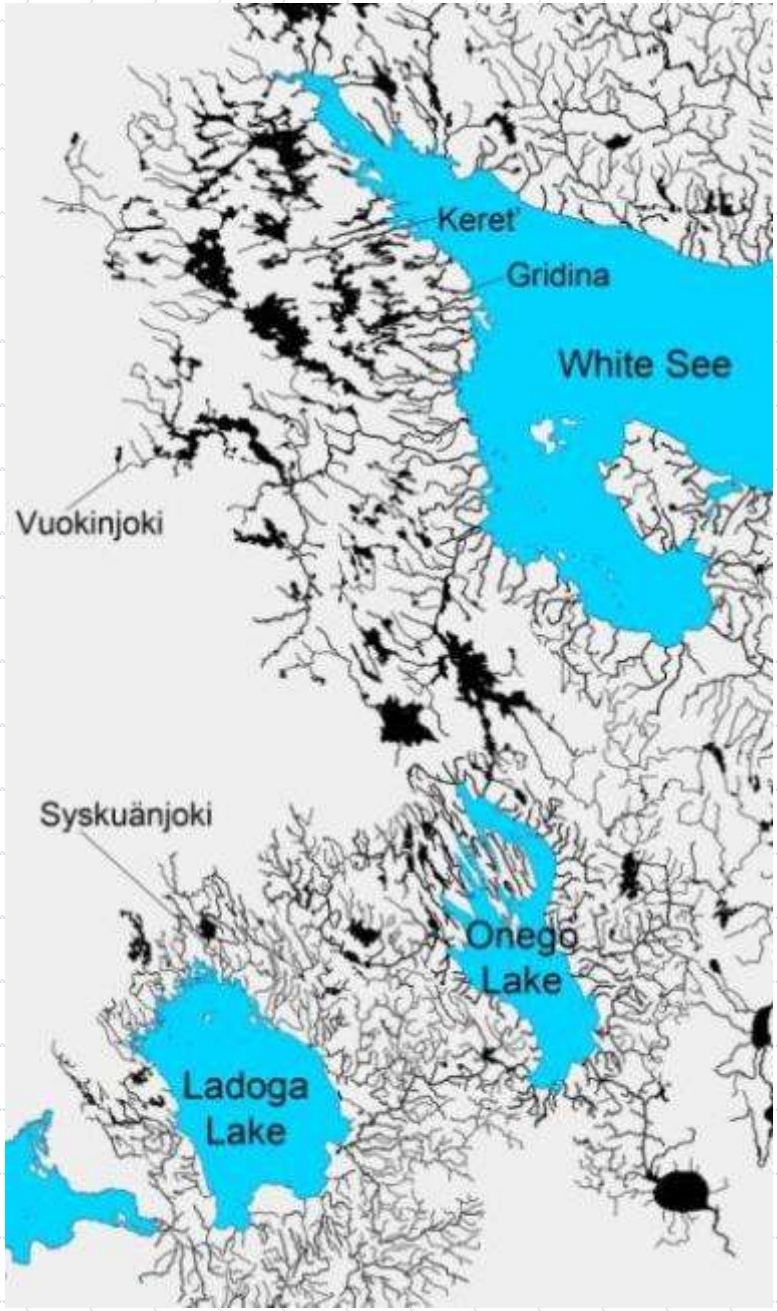
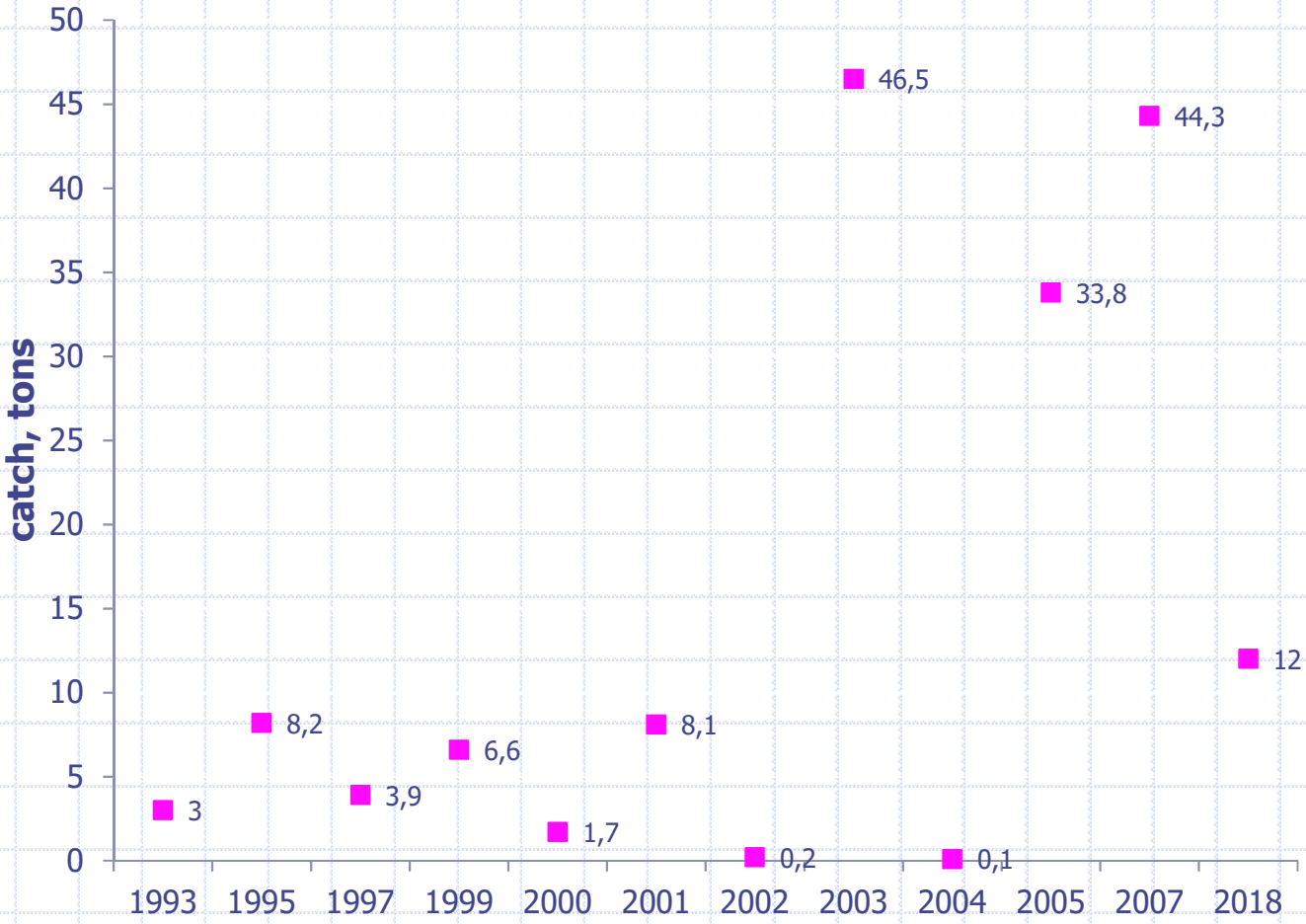
Component 2
Component 1



Ecological consequences of the pink salmon introduction

Pink salmon catches in the White Sea



Pink salmon in the Barents region - Svanvik 2018

Many rivers in the Kola Peninsula and Karelia harbor populations of the freshwater pearl mussel

- The mussel has a *complex life cycle* involving salmonids – Atlantic salmon (*Salmo salar*) and brown trout (*Salmo trutta*).
  Pearl mussel larvae (glochidia) get attached to the gills of juvenile salmonids. Infestation happens in autumn, and the next spring young mussels leave the host.
  We found that the pink salmon can be infested by glochidia, but is unable to maintain the pearl mussel as an intermediate host, since the fish die after spawning.
  Glochidial survival is critically low (ca. 0.004%); infestation of the non-specific host in the situation of its high abundance and high intensity of the glochidial infection may pose threat to the survival of the pearl mussel.

Thank you for attention!

Спасибо за внимание!