

Vertical distribution and feeding habit of mesopelagic fishes and squids off northeastern Japan

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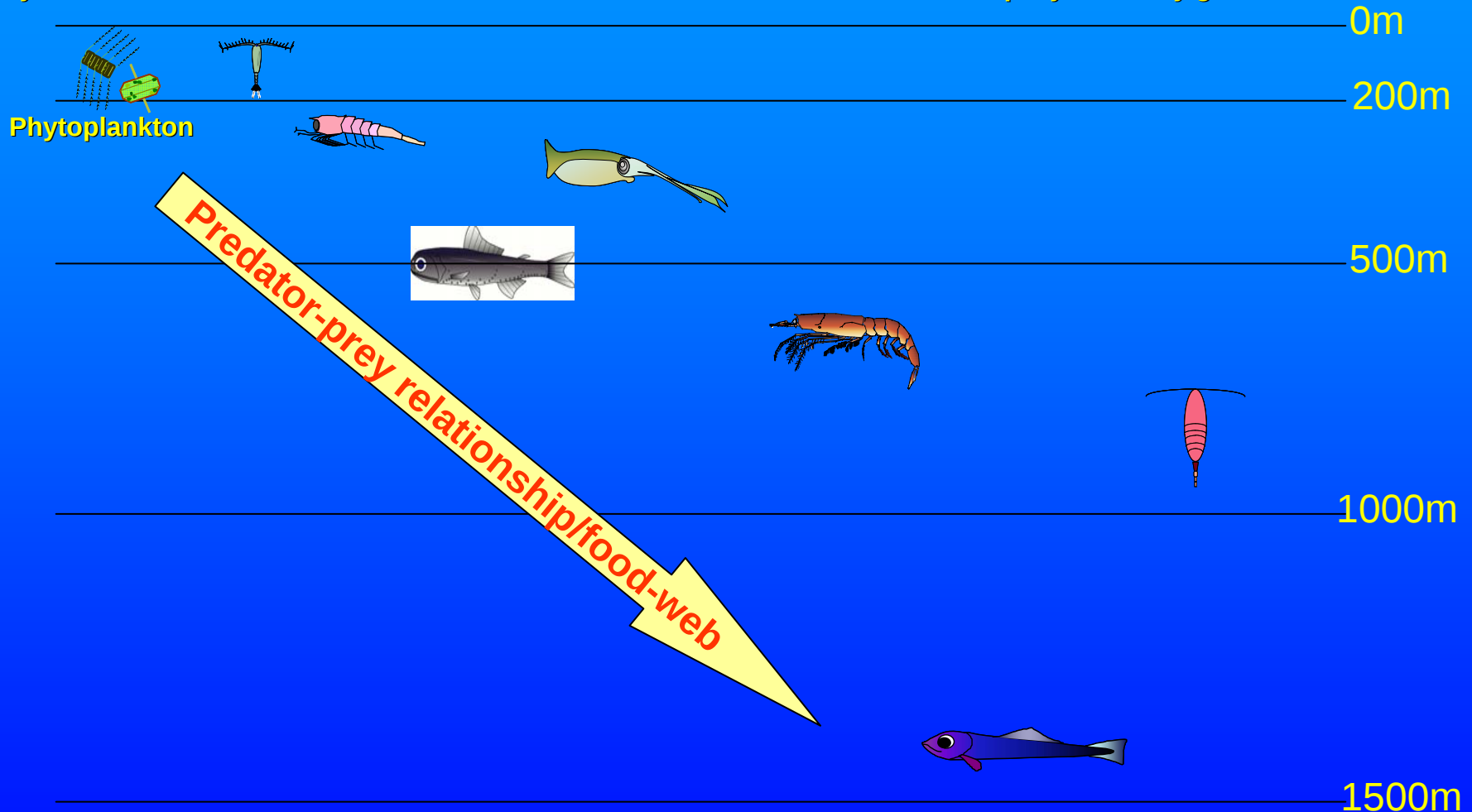
Vertical distribution and migration are The Key Point of research on the ecology of mesopelagic micronekton

Diurnal vertical migration

Feeding in shallow layer at night and sink to deep layer during daytime

Ontogenetic vertical migration

distribute shallow layer during young and sink to deep layer as they grow



Micronekton

- They are too large and too good swimme to collect by usual plankton nets.
- Their ecological information is quite restricted because most of them are living in open ocean and not important for fisheries.
- Their biomass thought to be high.
- They should play important roles for vertical transportation of organic matter through the food web

It is necessary to reveal the biomass of micronekton precisely

using various effective sampling gears

R/V Wakataka-maru

(Tohoku National Fisheries Research Institute)



Quantitative sampling gear for
Micronekton

4m²MOCNESS



Quantitative sampling gear
for micronekton

MOHT frame trawl

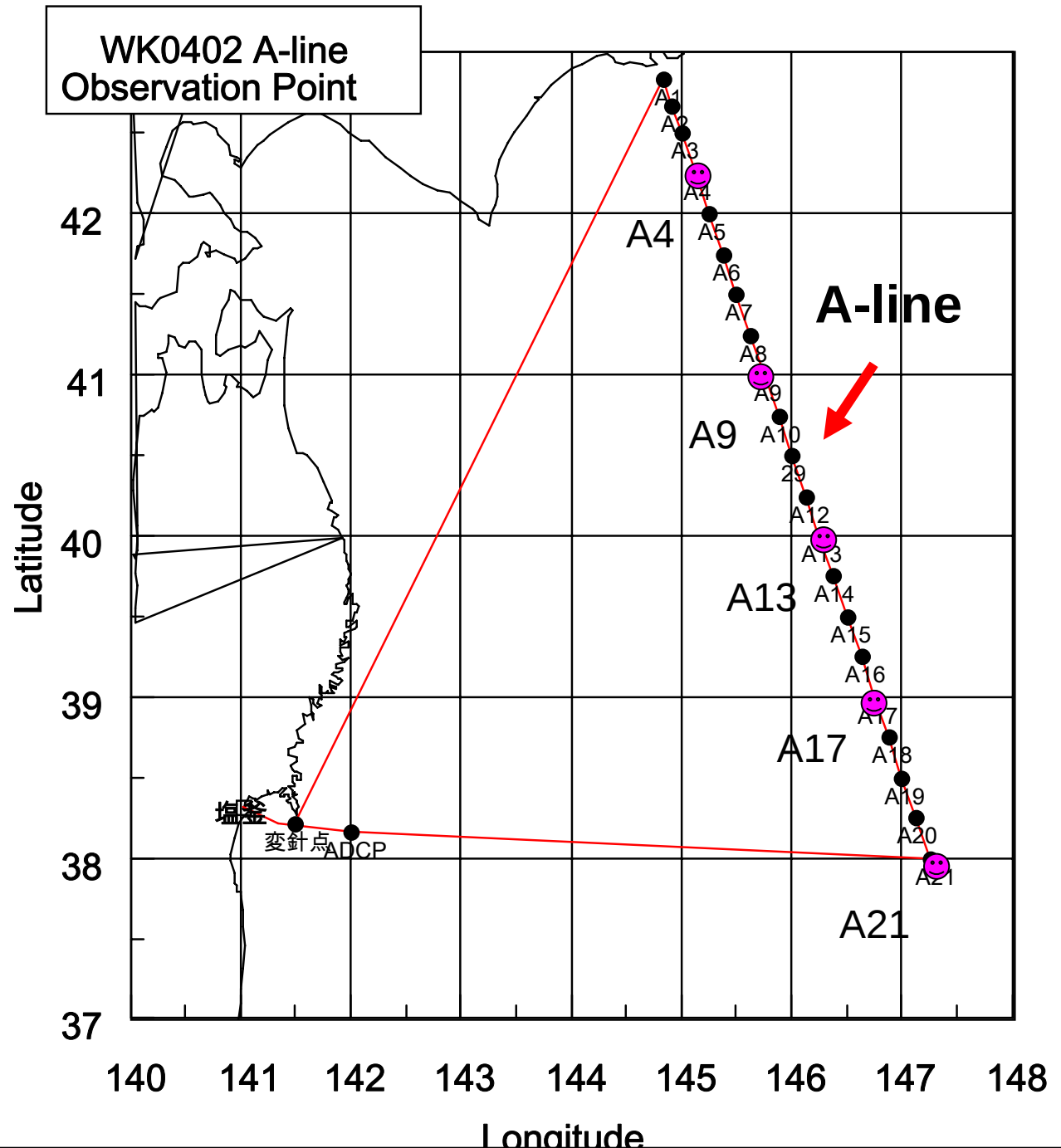
(5m² mouth area)



Sampling stations

A-line is the fixed oceanographical monitoring line conducted by

HNFRI TNFRI



Representative mesopelagic fish

Myctophidae

off eastern Japan



Diaphus theta

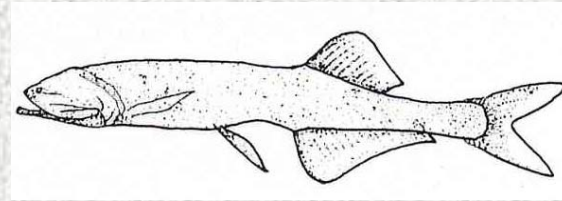


Myctophum asperum

Gonostomatidae



Sigmops gracile



Cyclothone atraria

Microstomatidae



Lipolagus ochotensis

Chauliodontidae



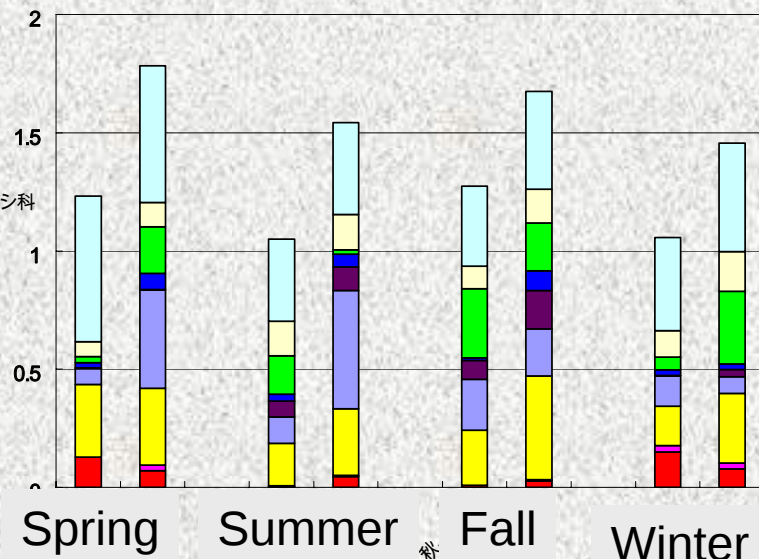
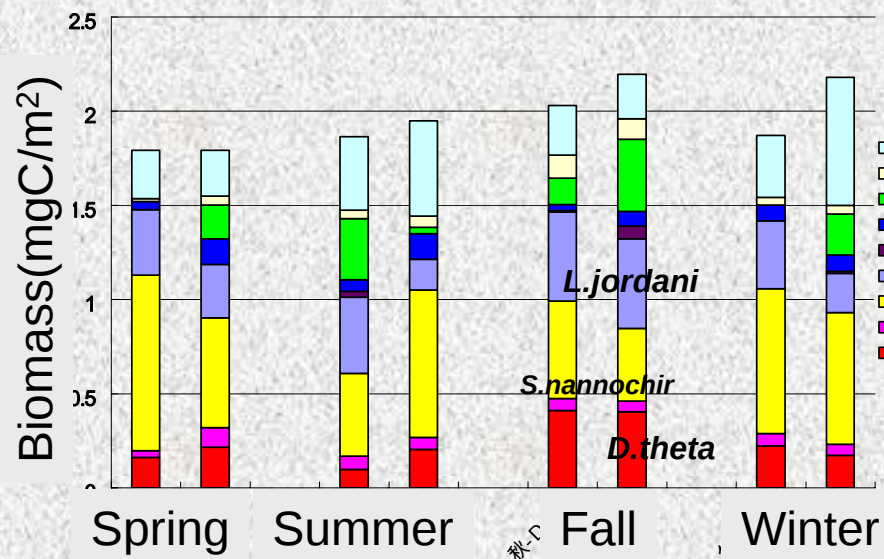
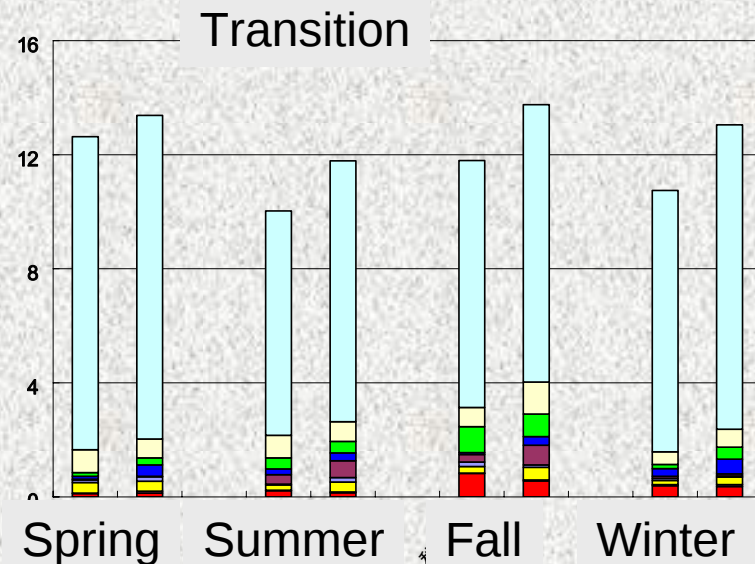
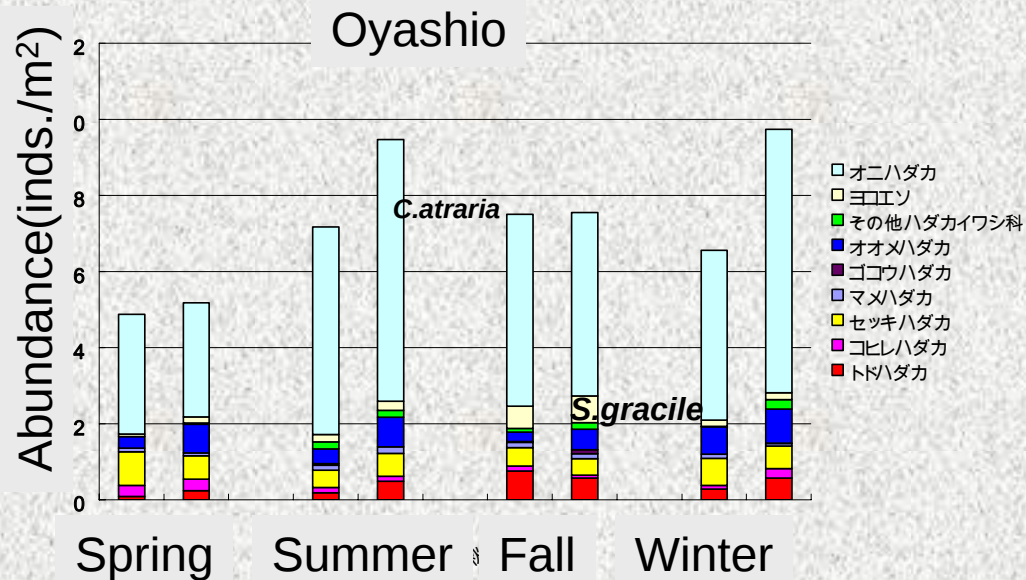
Chauliodus macouni

Nemichthyidae

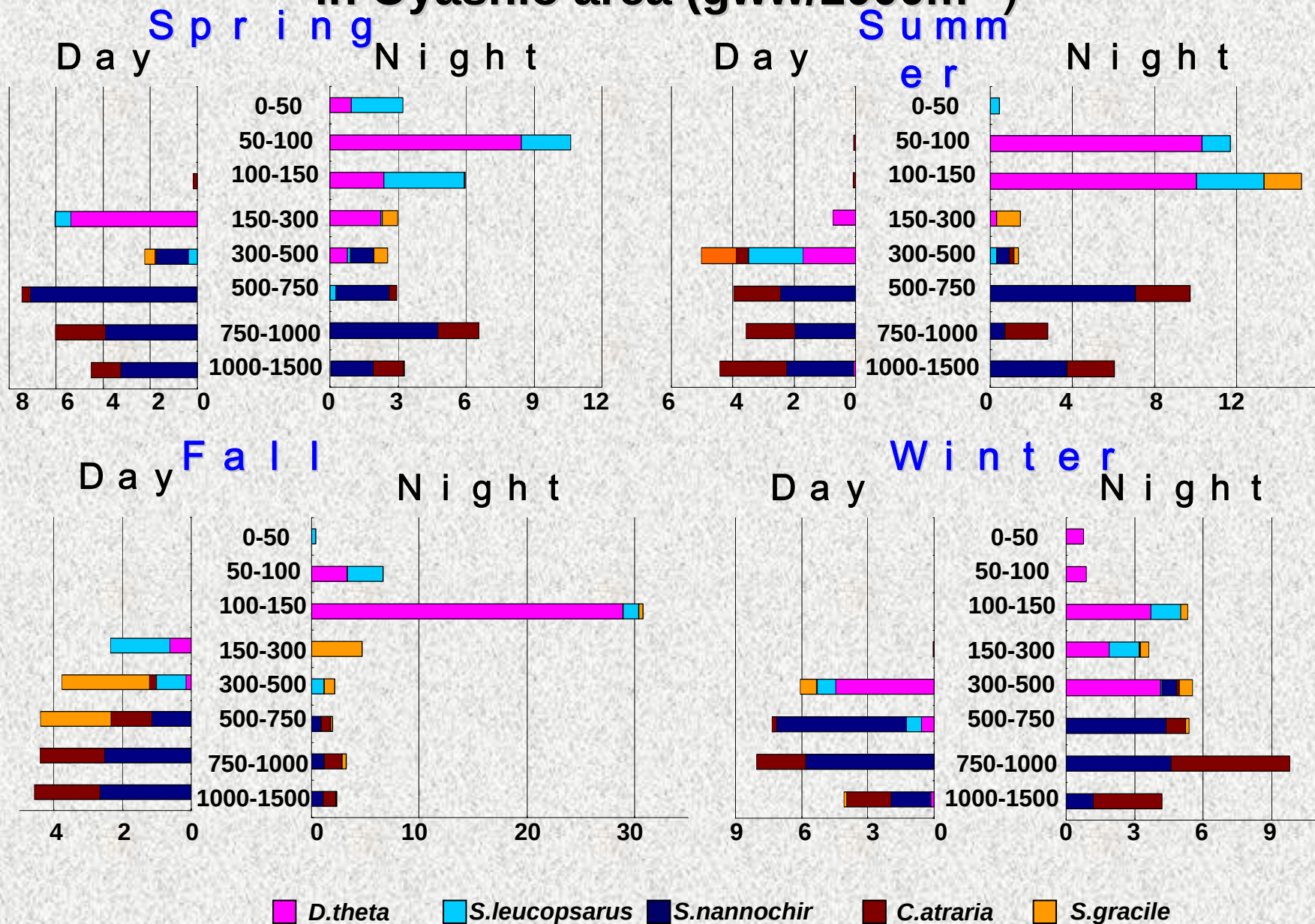


Nemichthys scolopaceus

Seasonal variations of Abundance and biomass of mesopelagic fishes Collected by 4m² MOCNESS at 0-1500m deep layers



Vertical distributions of dominant fishes in Oyashio area (gww/1000m³)



Vertical distribution of dominant fishes in Oyashio-Kuroshio transition area (gww/1000m³)

Spring

Day

Night

Summer

Day

Night

Fall

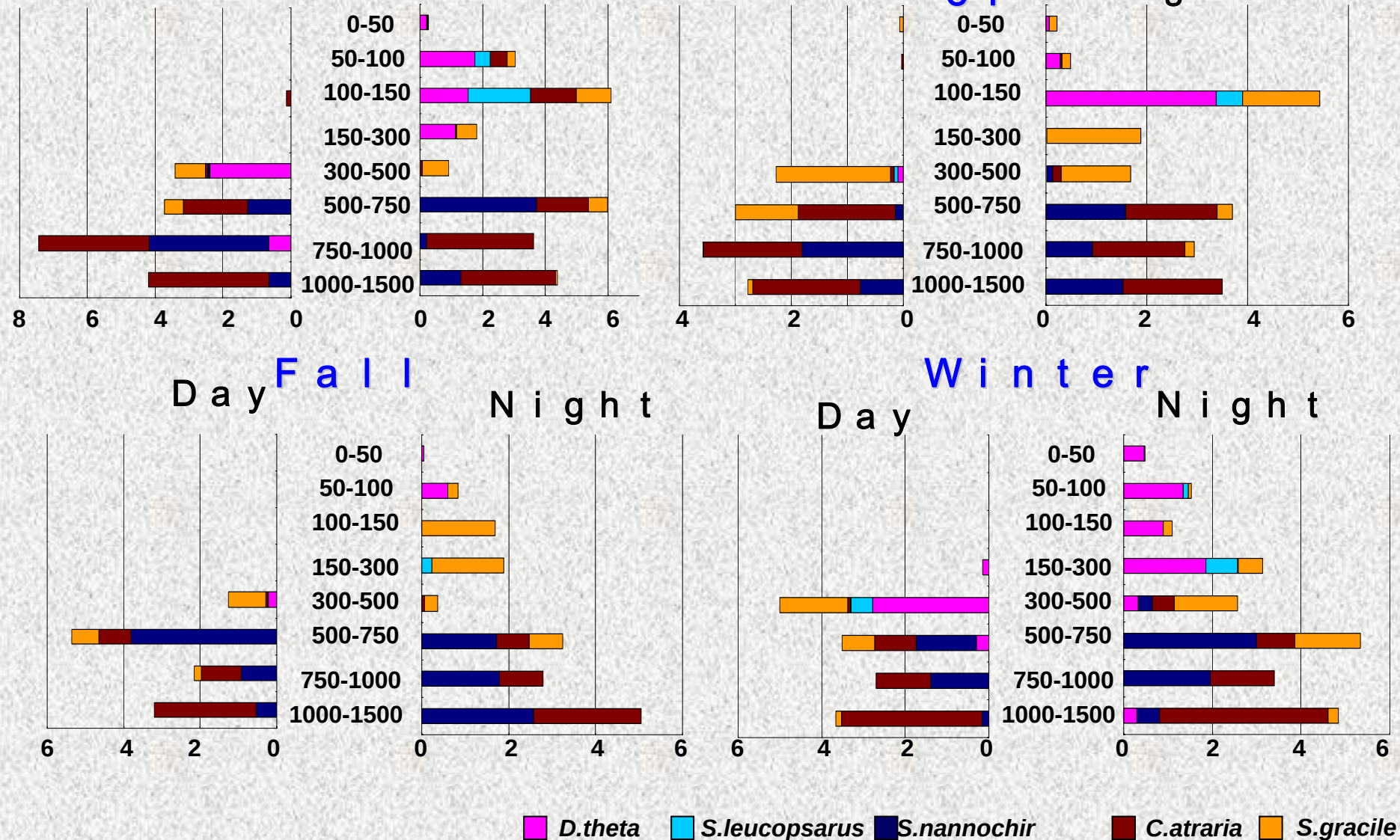
Day

Night

Winter

Day

Night



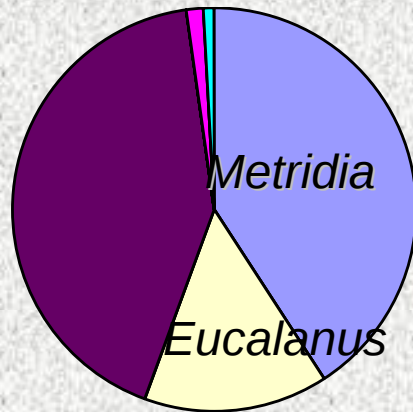
Sesasonal variation of gut contents of *D.theta* and *S.nannochir* collected by MOCNESS in Oyahsio

May

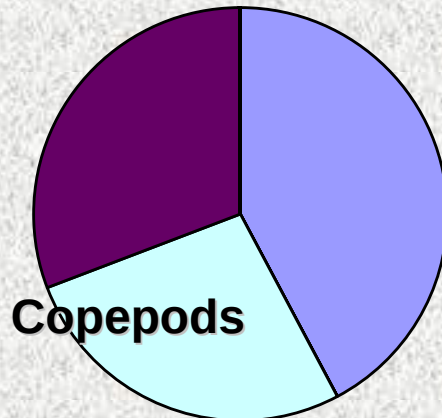
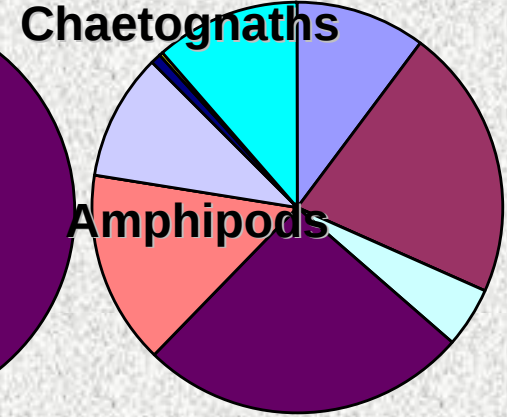
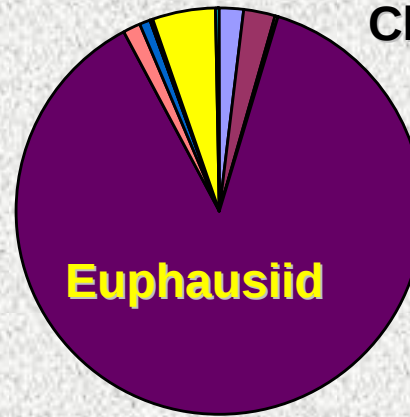
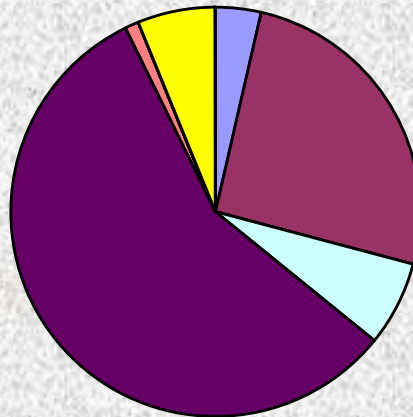
July

September

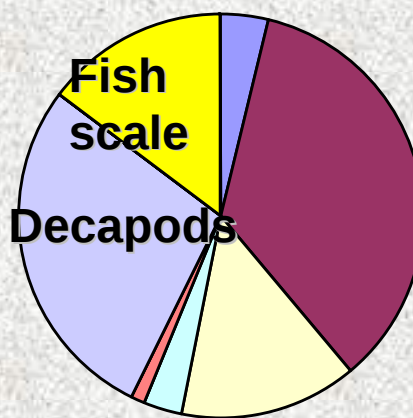
February



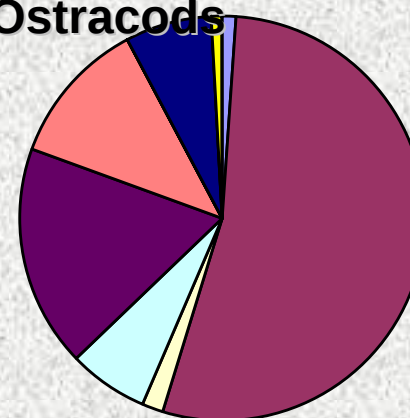
D.theta



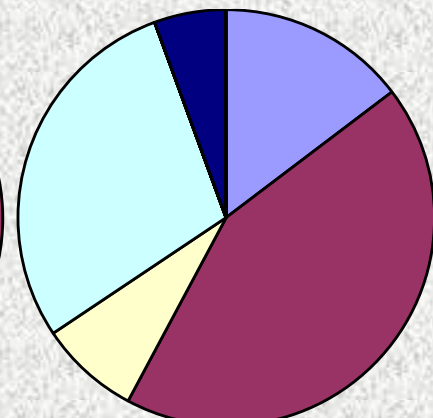
S.nannochir



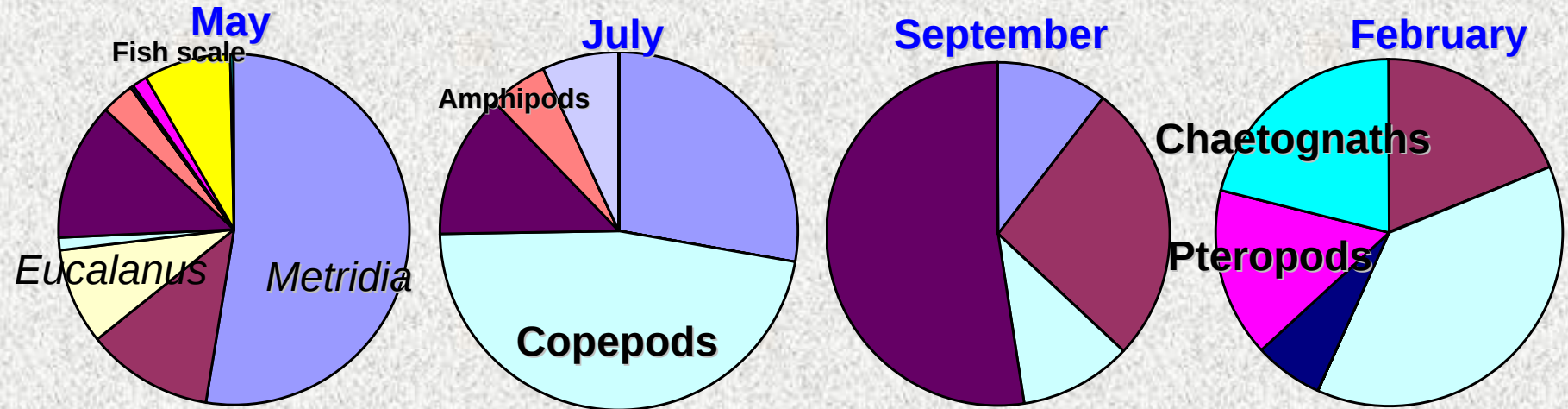
Ostracods



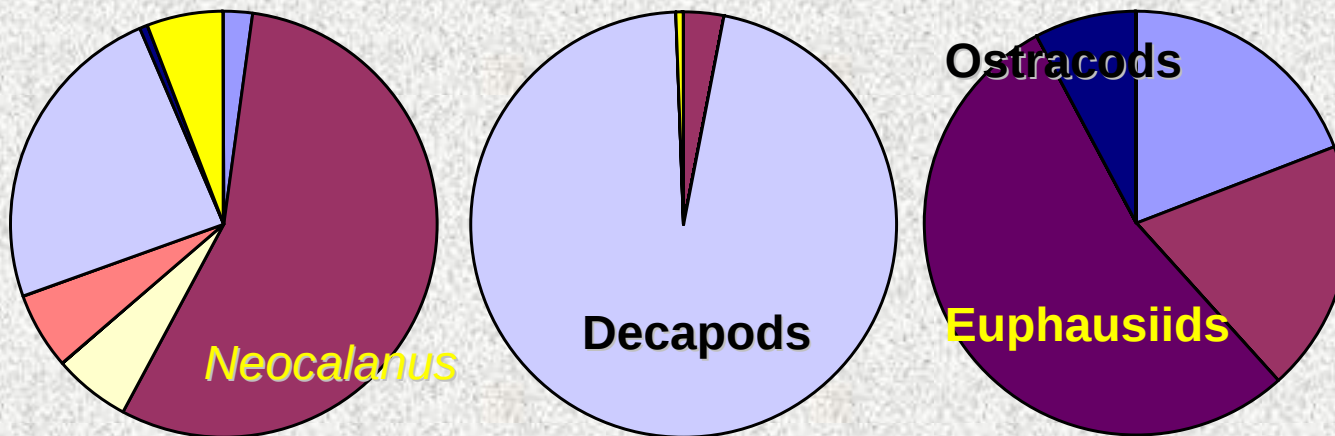
Neocalanus



Sesasonal variation of gut contents of *D.theta* and *S.nannochir* collected by MOCNESS in Oyahsio-Kuroshio transition area

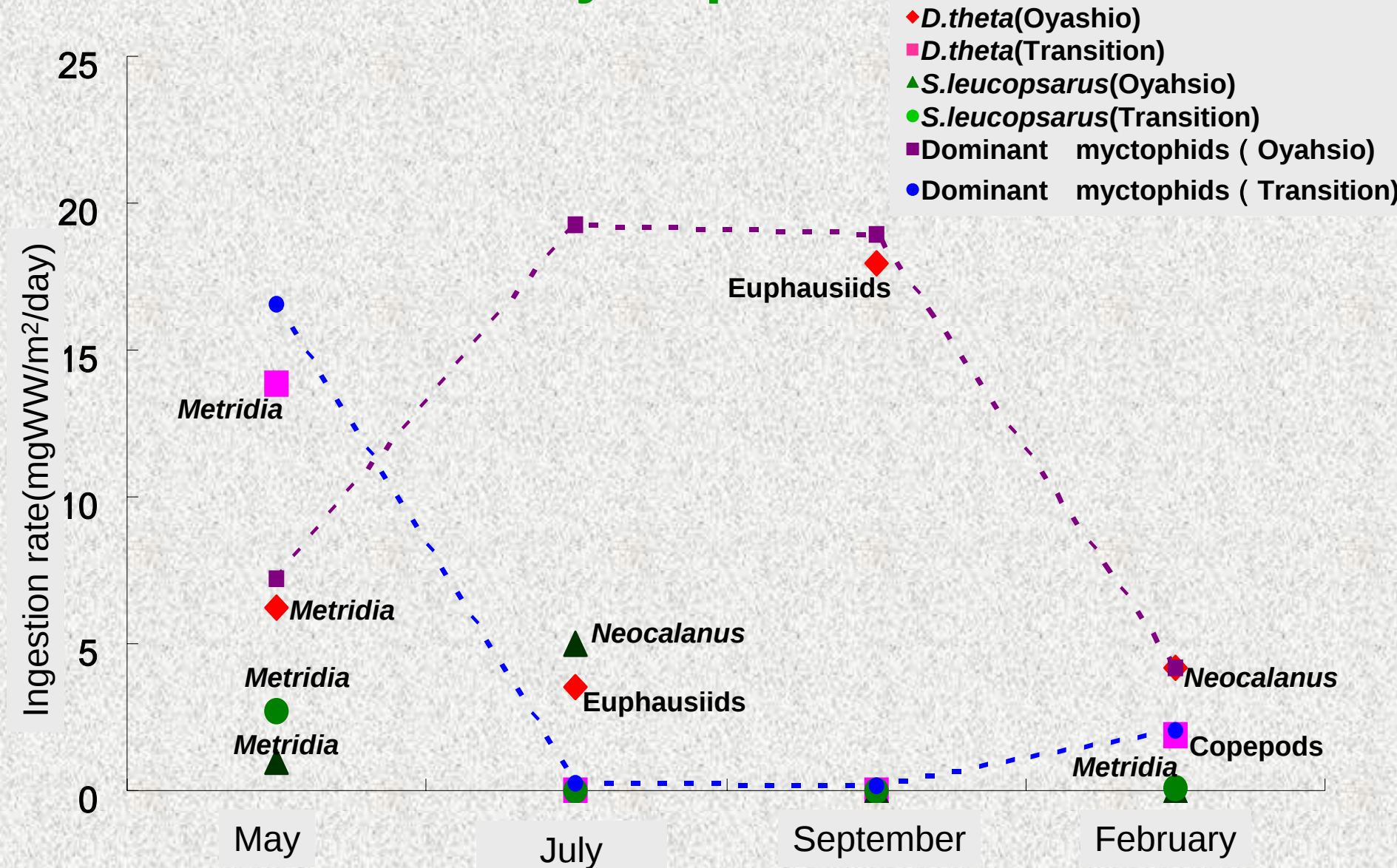


D.theta

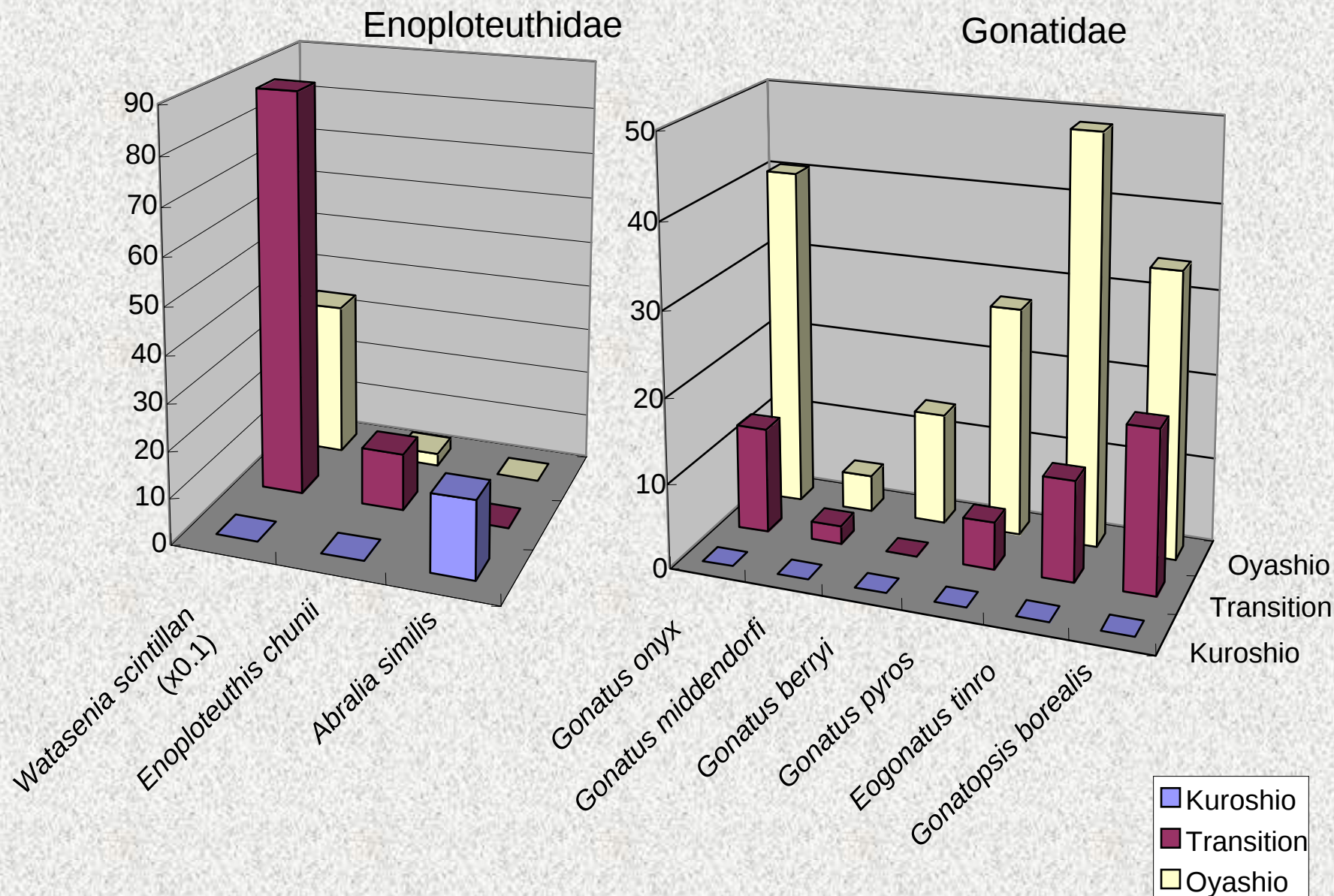


S.nannochir

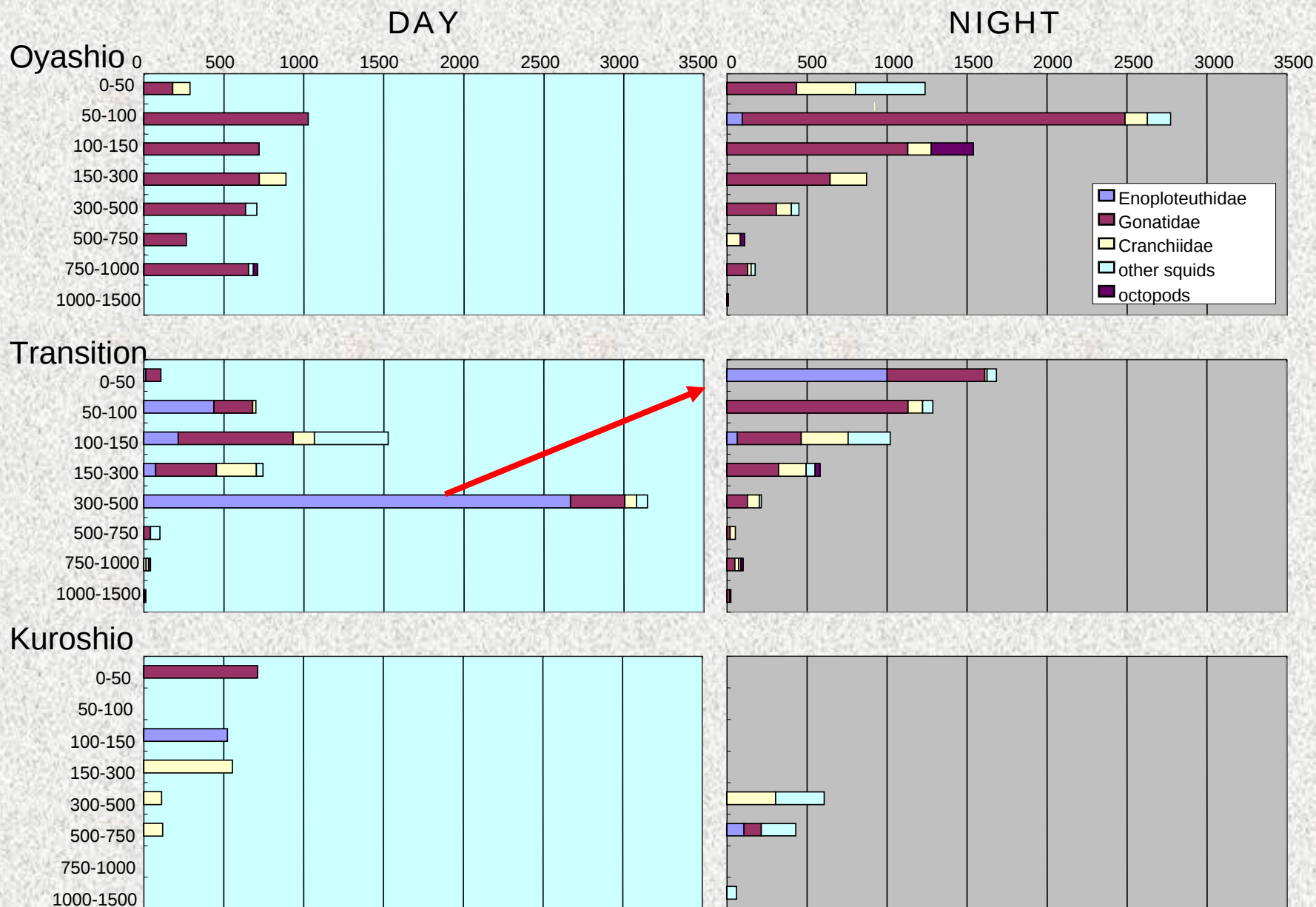
Seasonal variation of accumulated ingestion rate of dominant myctophids at 0-150m depth

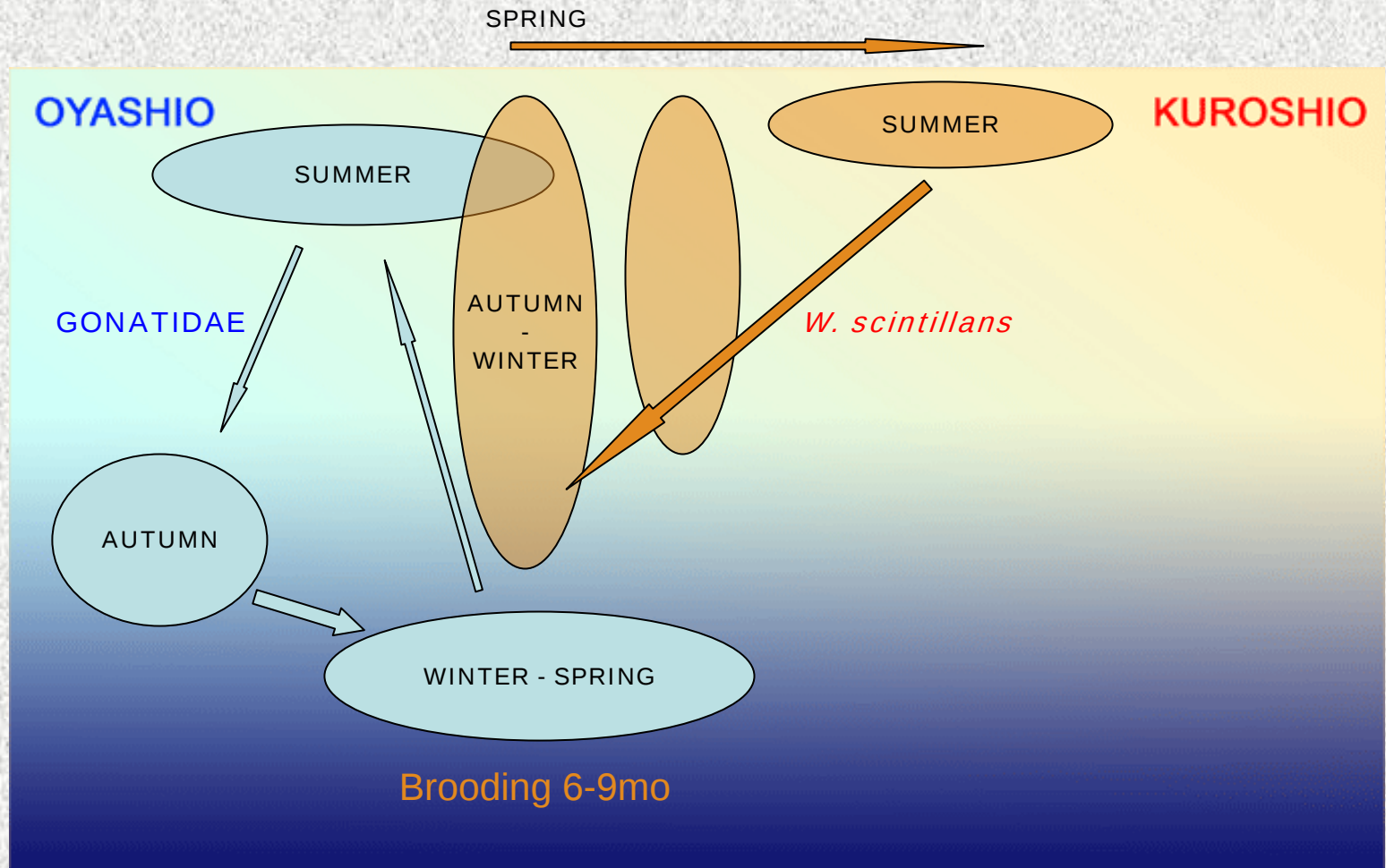


Horizontal distribution of dominant Enoploteuthidae and Gonatidae off western North Pacific (abundance: ind/100³m³)

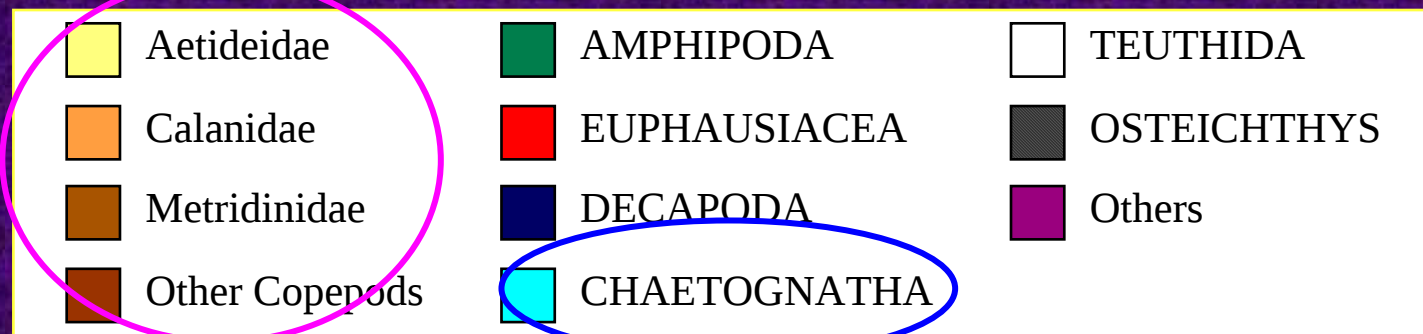


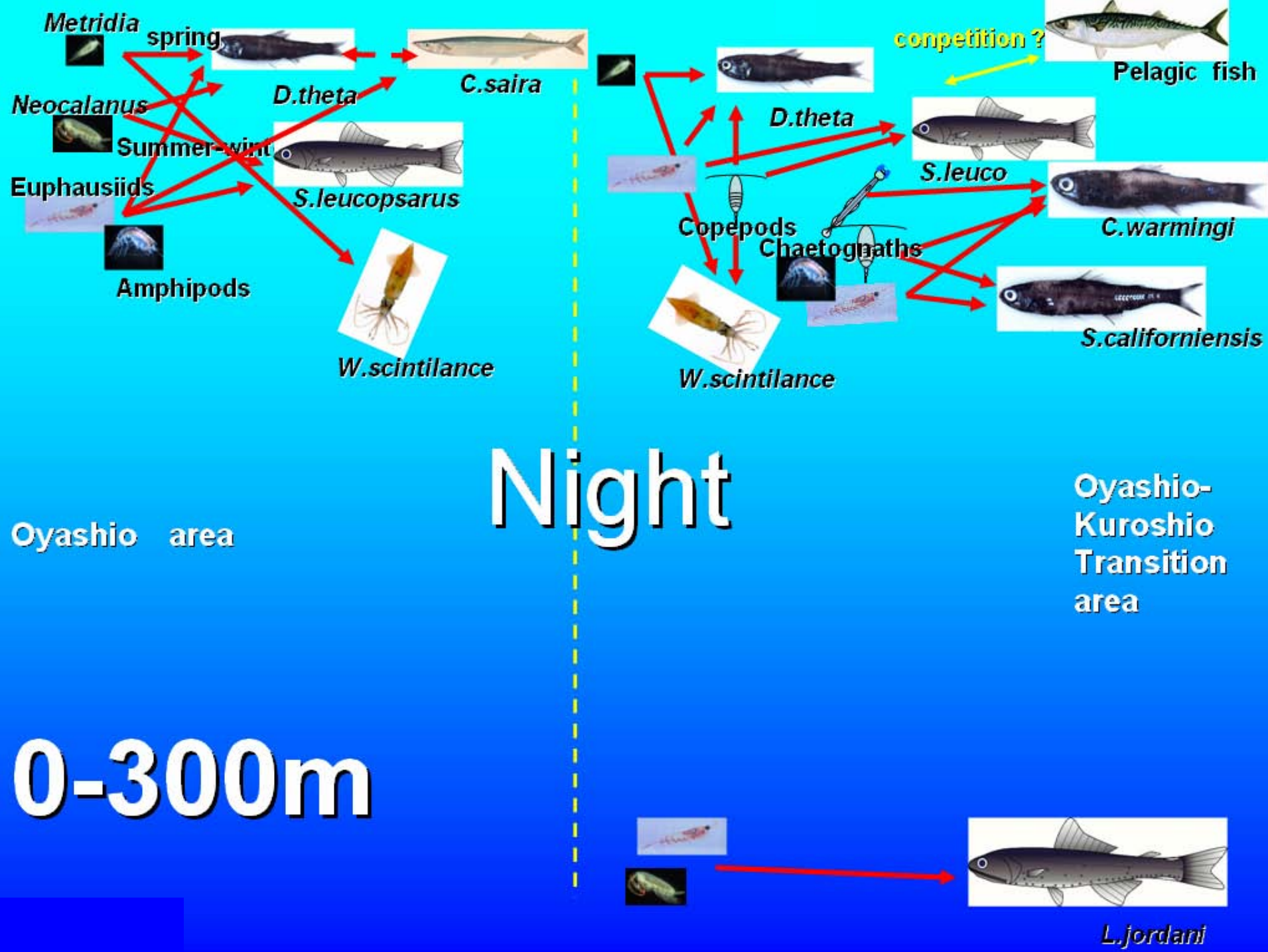
Vertical distribution of Cephalopods collected by 4m2MOCNESS during spring (ind./100³m³)





Feeding habits of dominant mesopelagic squids







C. saira



Pelagic fish

Neocalanus



Euphausiids



Metridia



Oyashio area



Copepods



Day

Oyashio-Kuroshio Transition area



0-300m

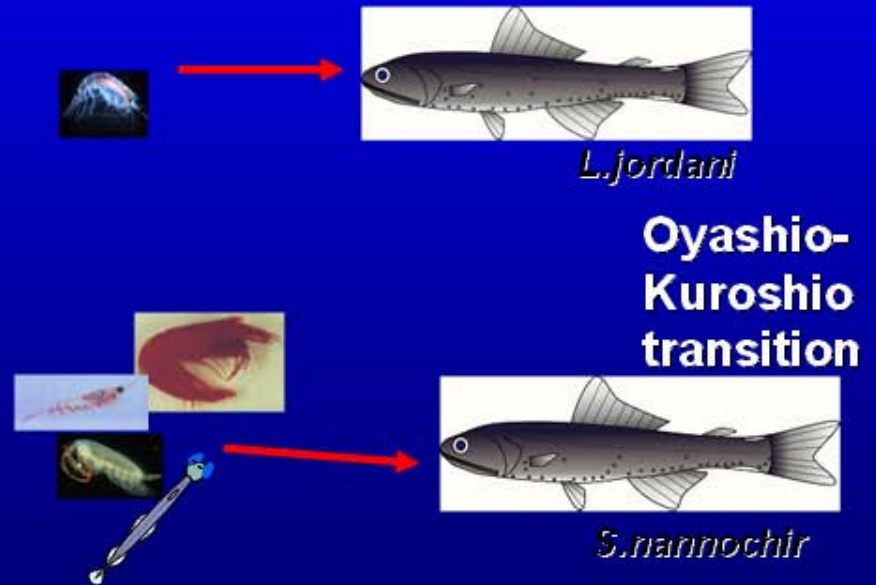
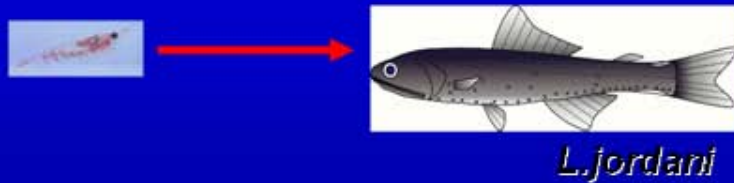


L. jordani

300-1000m

Oyashio

Night



300-1000m



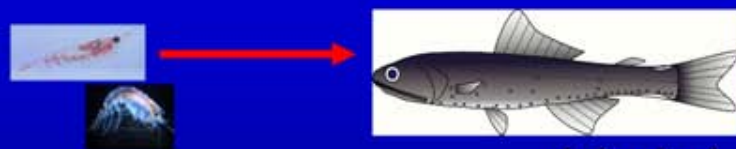
D.theta



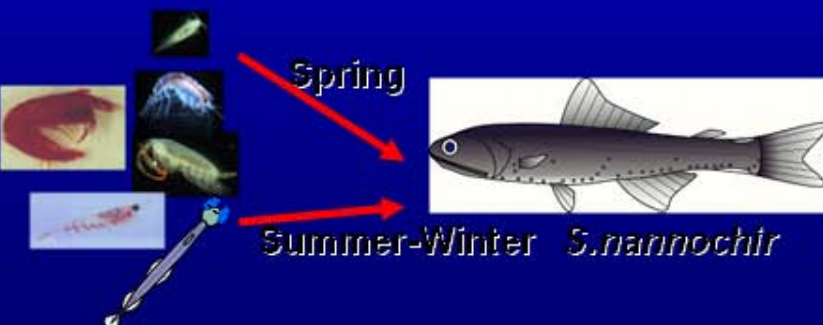
S.leucopsarus

Oyashio

Day



L.jordani



S.nannochir



S.leucopsarus



D.theta



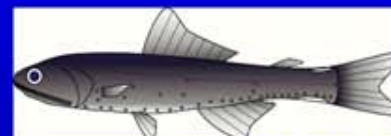
Shrimp



C.warmingi



S.californiensis



L.jordani



S.nannochir

Oyashio-
Kuroshio
transition

Conclusion

- Quantitative seasonal and vertical samplings for micronekton has been conducted at the fixed stations off western North Pacific
- Biomass of myctophids are dominant micronekton in this study area
- Some species of myctophid and squids performed diel vertical migration
- Variation of feeding habit of micronekton (squids and myctophids) were observed precisely

By synthesizing the results of this study, we are now assessing the vertical transportation of organic matters in the open ocean by micronekton