



Part III: Copepoda

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References

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- 陈清潮等, 1974. 南海的浮游桡足类 I, II. 海洋学集刊, 9: 101-116, 125-137
- 陈清潮, 1983. 南海的浮游桡足类 III. 南海海洋生物研究论文集 (一): 133-138
- 郑重等, 1965. 中国海洋浮游桡足类 (上卷)
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2 Classification

- 躯体形态

1. 身体大小、形状和颜色
2. 头胸部节数，各节的大小比例，额部形状，末胸节后侧角的形态
3. 额角的形态、晶体和侧沟的有无，晶体的大小和位置
4. 腹部节数，各节的长短比例和形态
5. 生殖节（雌性）的大小和形态（是否对称、有无刺、毛、突起等），生殖节突起的构造
6. 尾叉的大小、形状，左右两叉是否对称，尾叉刚毛的长短比例及其分布

- 附肢形态

1. 第一触角的节数和体长的比例，刺、毛的分布情况，雄体执握触角的弯曲部分的构造
2. 第二触角、大颚，小颚和颚足的形态
3. 胸足的外肢和内肢节数、长短比例，刺、毛的数目和分布情况，特别是第五胸足，尤其是雄性第五胸足的形态和构造

2 Classification

Sars(1901-1903), Gurney(1931-1933)

2.1 Order Clanoidea

2.1.1 Tribe Amphaskandria

2.1.2 Tribe Heterarthrandria

2.1.3 Tribe Isokerandria

2.2 Order Cyclopoida

2.3 Order Harpacticoida

2.4 Order Monstrilloida

2.1.1.1 Family Calanidae

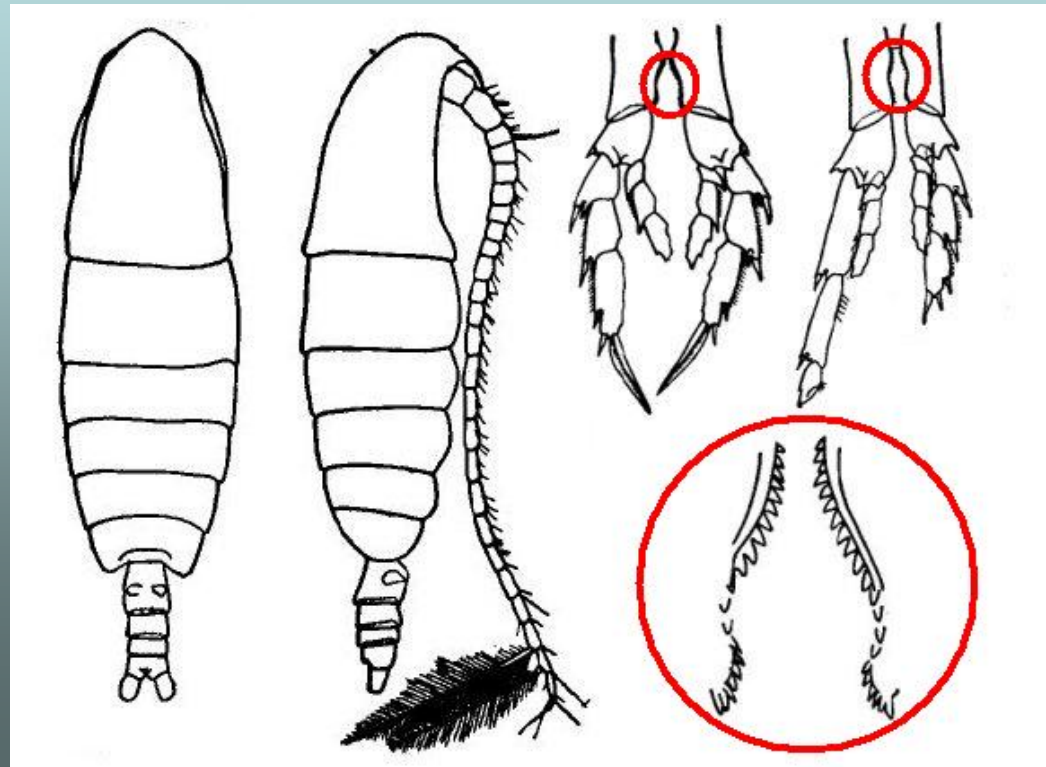
Moderate size

Th 4-5, Ab ♀ 4 ♂ 5, A₁

Calanus

C. sinicus

P₅B₁ denticulate



Undinula

postero-lateral angles(PLAs) pointed

U. vulgaris

PLAs bifurcate

P₂ Re notch

P₅ (♂)

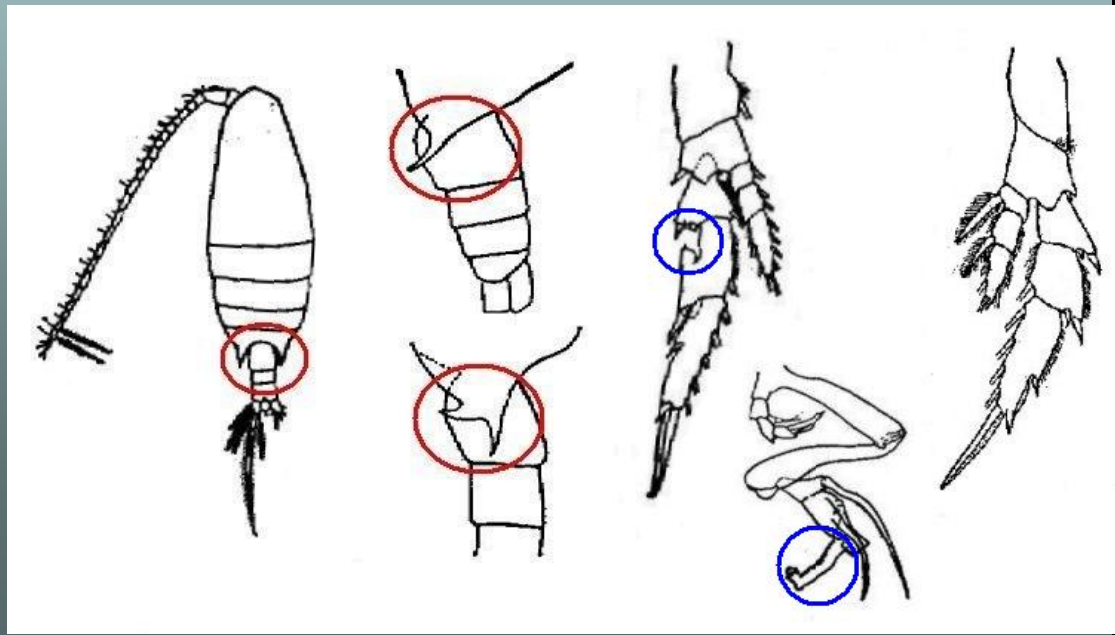
right leg short

left leg without Ri,

Re with a vermiform



U. vulgaris



2.1.1.2 Family Eucalanidae

body large, prosome elongated, head pointed triangular, Ab ♀ 2-3 ♂ 3-4

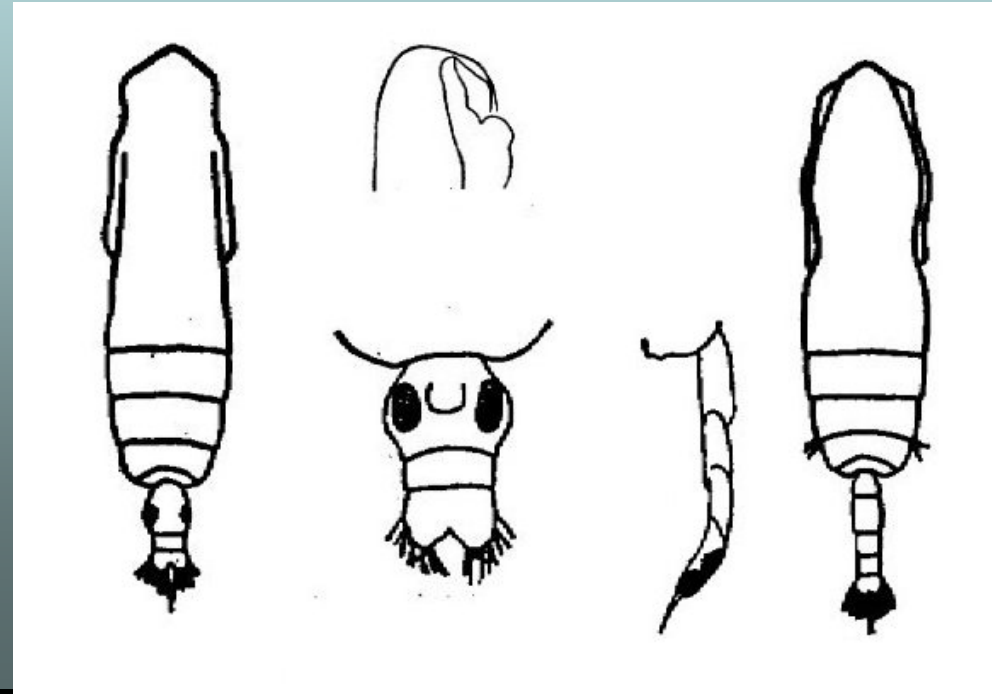
P₅ rudimentary, ♀ lacking ♂ left leg long

Eucalanus

E. subcrassus

♀ genital somite longer than wide

♂ P₅ right leg lacking



Rhincalanus

forehead conical process

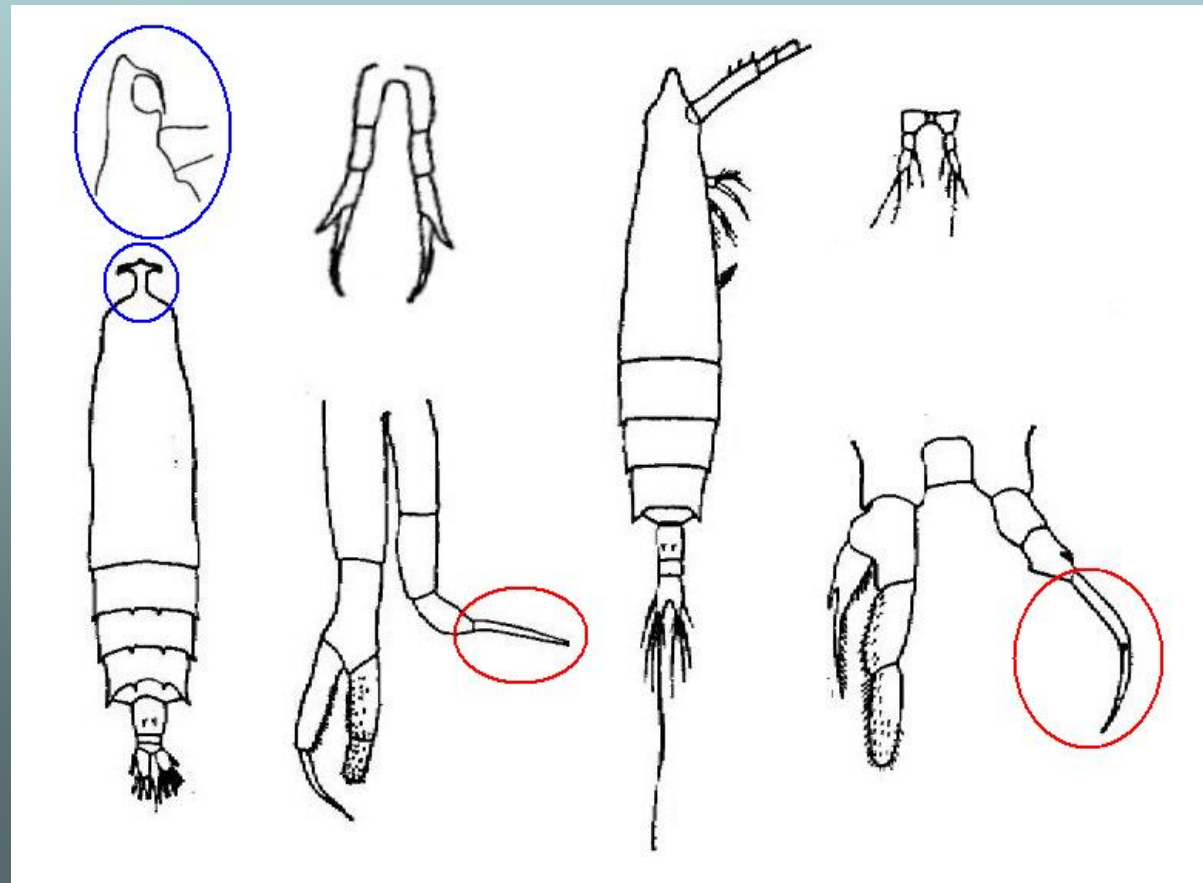
P5 ♀ ♂ uniramous except ♂ left leg biramous

R. cornutus

head anchorlike

R. nasutus

head conical



2.1.1.3 Family Paracalanidae

small form, Ab ♀ 2-4 ♂ 5

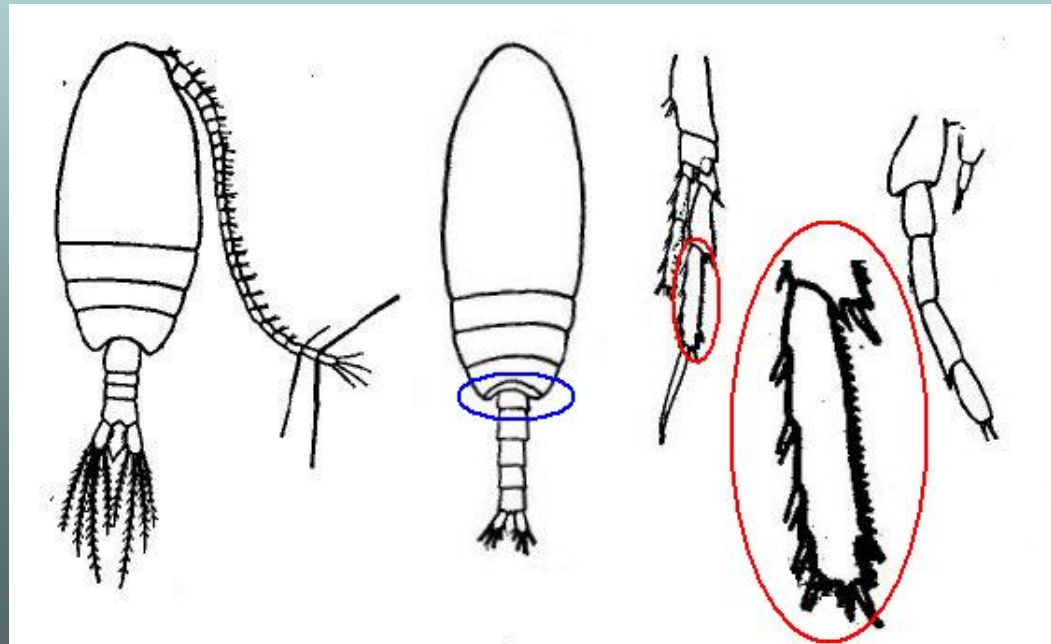
P₅ rudimentary, uniramous

Paracalanus

P₂₋₄ Re₃ denticulate

P. parvus

♀ P₄ second segment
without spinules on
posterior surface



2.1.1.4 Family Euchaetidae

large in size, PLAs rounded or pointed,
Ab ♀ 4 ♂ 5, ♀ genital prominent,
P₅ ♀ lacking, ♂ well developed

Euchaeta

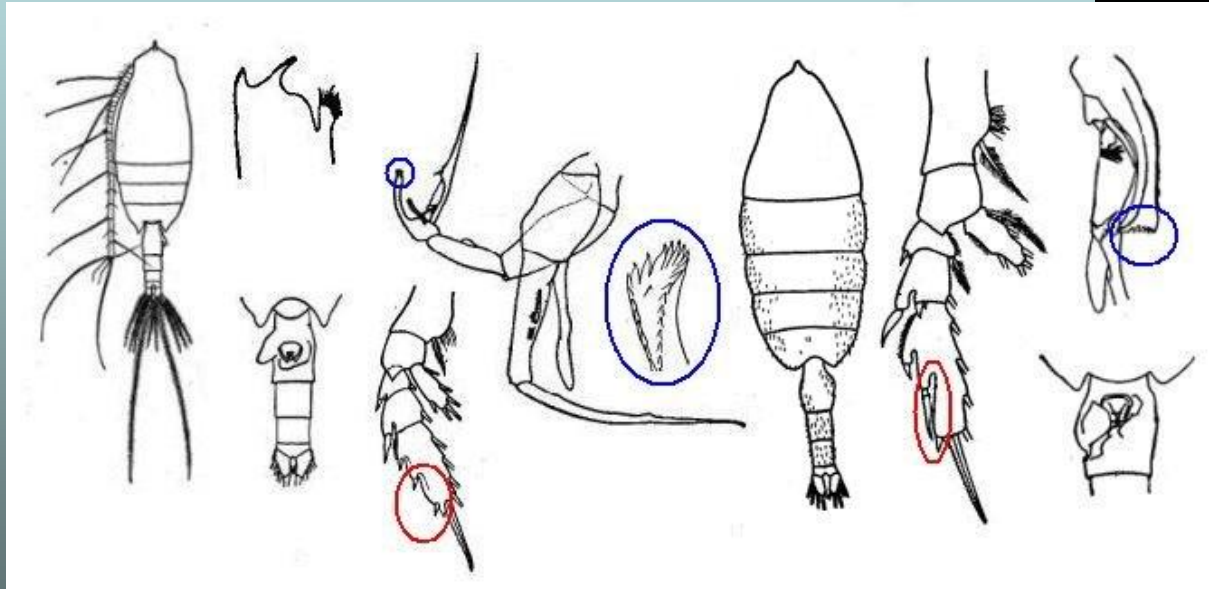
E. marina

P₅ ♂ left leg
spade-like process

E. concinna

♀ genital somite
with protuberance

P₅ ♂ left leg lamellate-like process



2.1.2 Tribe Heterthrandria

♀ A_1 asymmetrical, form a grasping organ

2.1.2.1 Family Temoridae

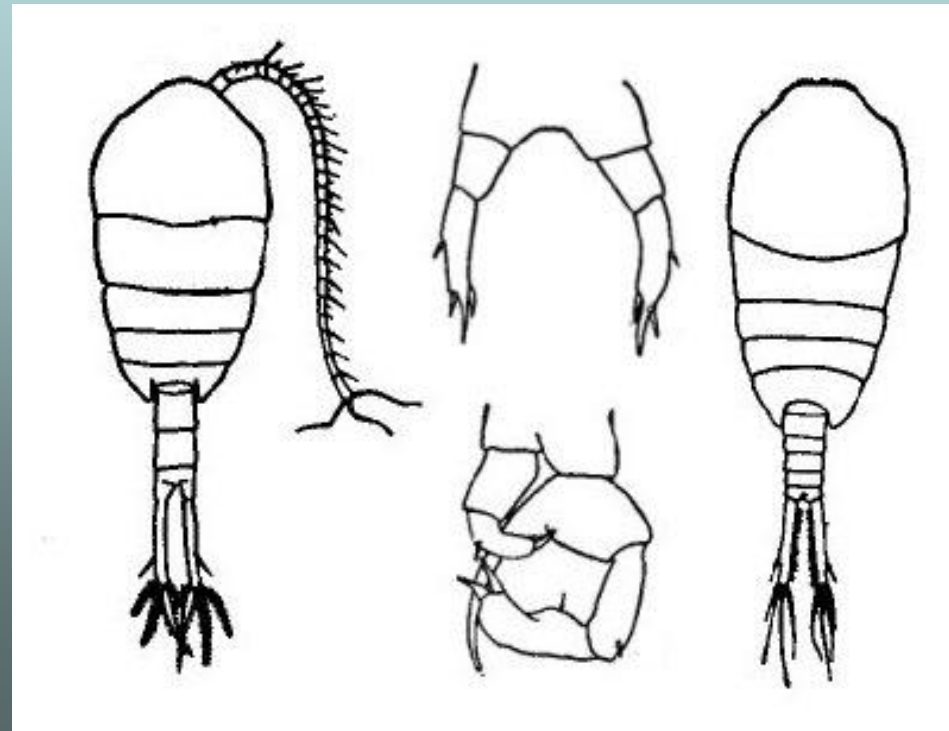
small size, Ab ♀ 3 ♂ 5, caudal rami elongated

Temora

prosoma broadly short,
rounded in front,
caudal rami slender

T. turbinata

caudal rami elongate;
 P_5 ♂ left leg 4, chela-like,
right leg 3



2.1.2.2 Family Centropagidae

moderate or small in size, PLAs rounded or pointed, Ab ♀ 3-4 ♂ 4-5

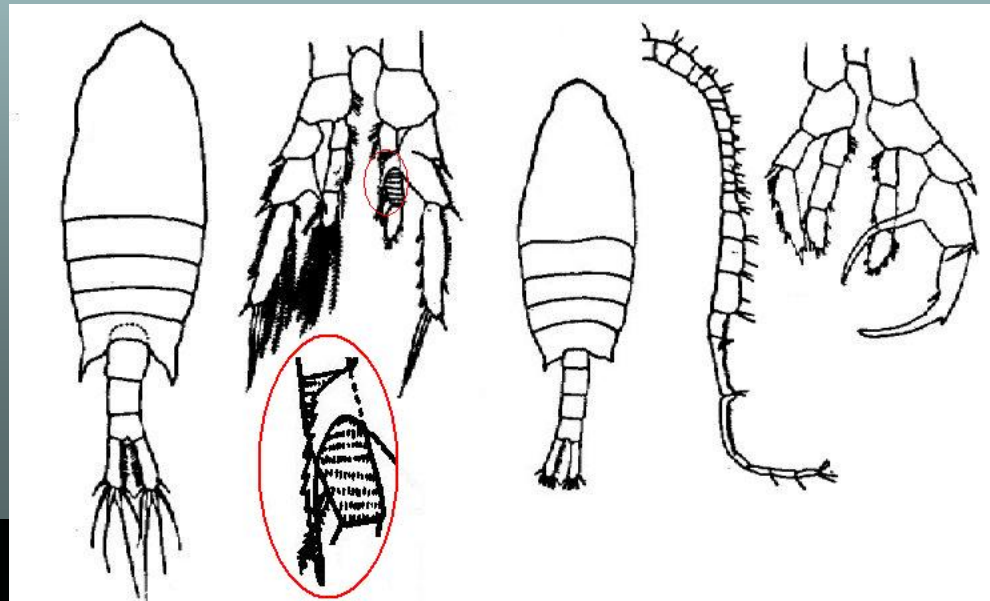
Centropages

P5 ♀ Re₂ spine, ♂ left leg Re 2 segments, right leg Re 3 segments, force-like

C. tenuiremis



C. typicus



2.1.2.3 Family Candaciidae

forehead truncate

Candacia

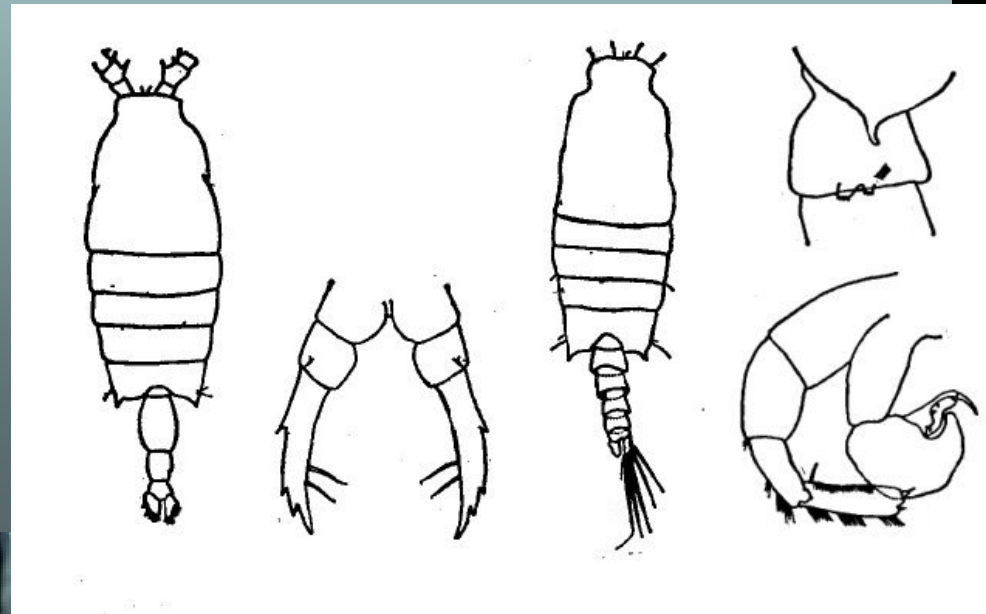
P₅ ♀ finger-like process or long setae

C. bradyi

genital somite

♀ with slight projection
on the right margin;

♂ with two rows of teeth
on right process



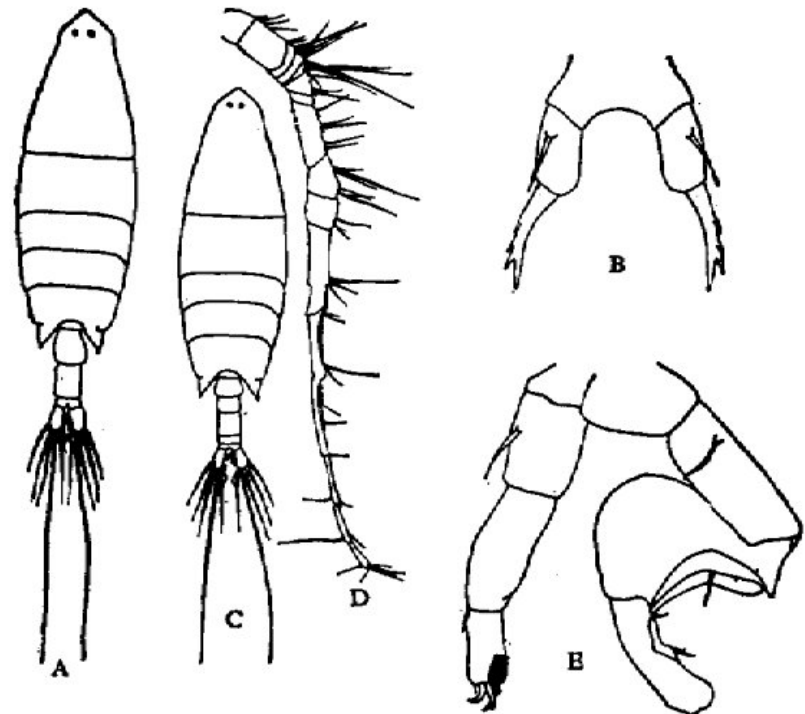
2.1.2.4 Family Pontellidae

moderate or large in size, forehead broadly large, with a spinal projection, paired lens

Labidocera

L. euchaeta

forehead narrowed,
with well-developed rostrum;
P₅ ♀ uniramous, 3 segments
♂ uniramous, 4 segments,
asymmetrical,
right leg semi-forceps



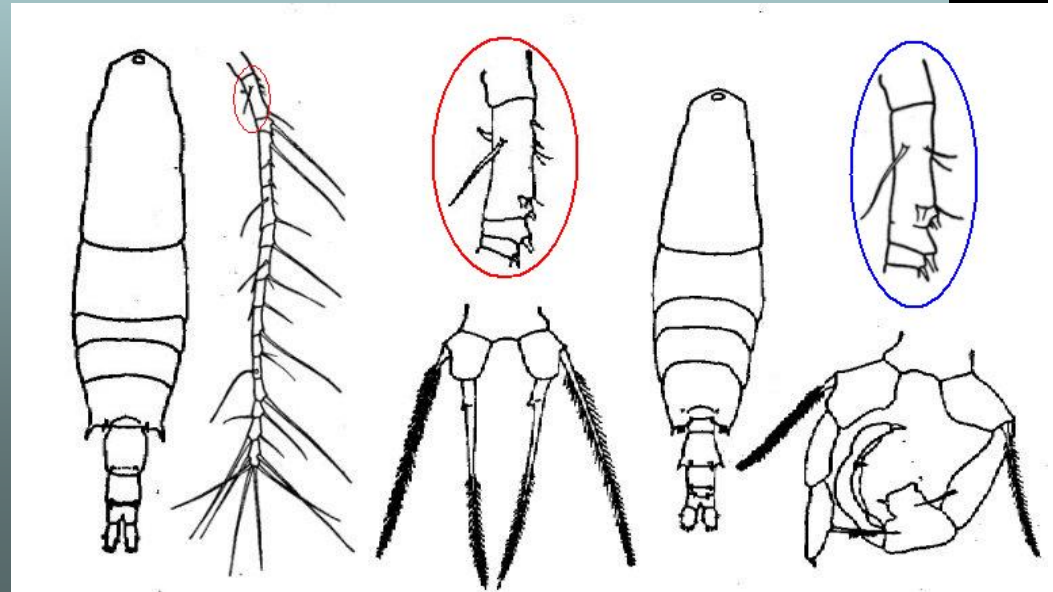
2.1.2.5 Family Acartiidae

small in size, with median eye, Ab ♀ 3 ♂ 5,
P₅ uniramous, ♂ asymmetrical

Acartia

A. spinicauda

PLAs pointed backward
A₁ a hook-like spinule on
the ventral margin
of 2nd segment



2.1.2.6 Family Tortanidae

moderate or small in size, forehead triangular,
Ab ♀ 2-3 ♂ 5, Ab and caudal rami asymmetrical

Tortanus

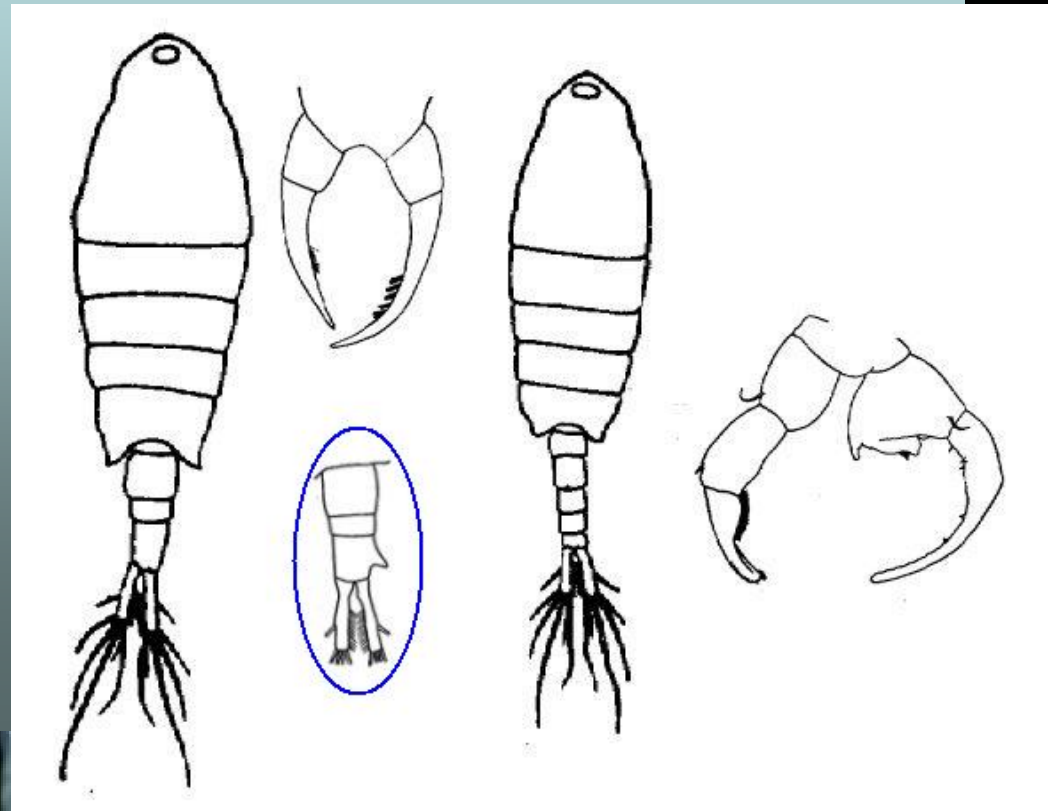
T. derjugini

♀ PLAs with a wing-like
process

P₅ uniramous

♀ 2-3 segments

♂ left leg 4 segments
right leg 3, forceps



2.2 Order Cyclopoida

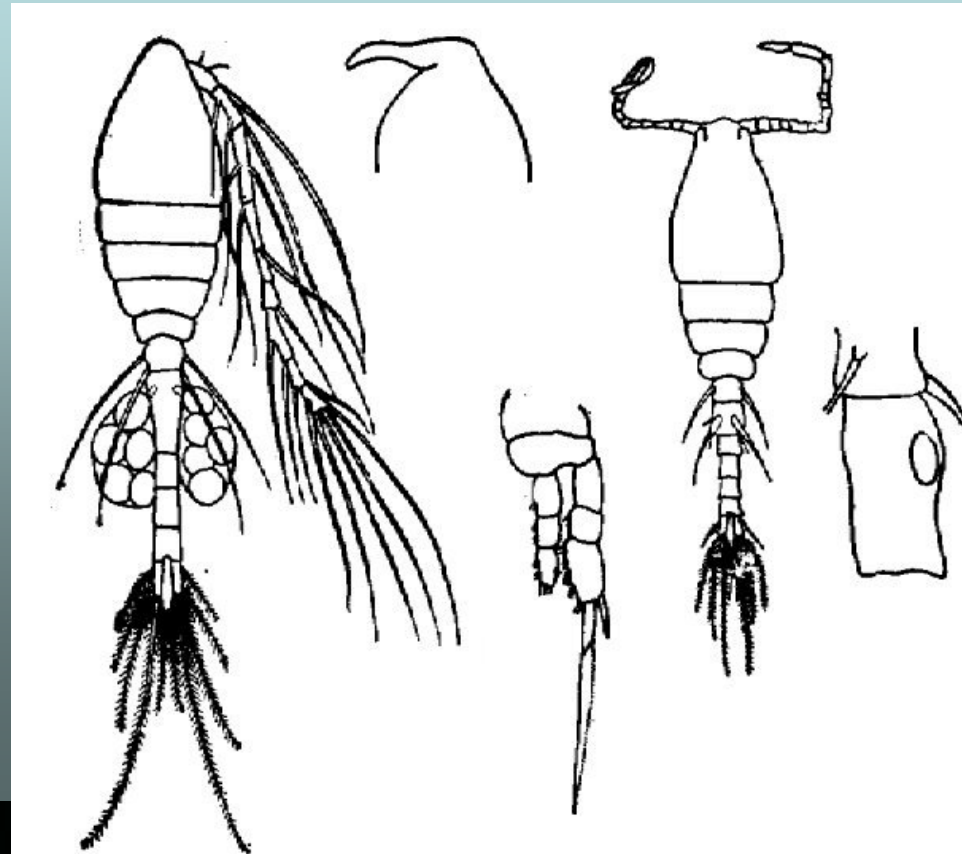
2.2.1 Family Oithonidae

small size, P₅ rudimentary

Oithona

O. similis

rostrum acuminat



2.2.2 Family Sapphirinidae

body dorso-ventrally depressed,
leaf like, with sexual dimorphism,
with paired lens on forehead

2.2.2.1 *Sapphirina*

S. nigromaculata

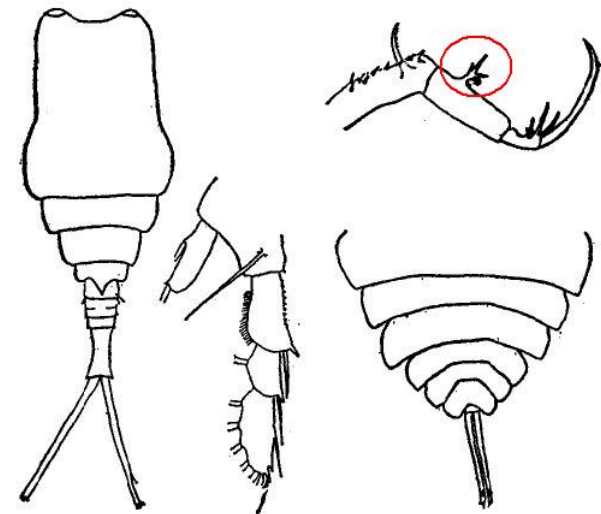
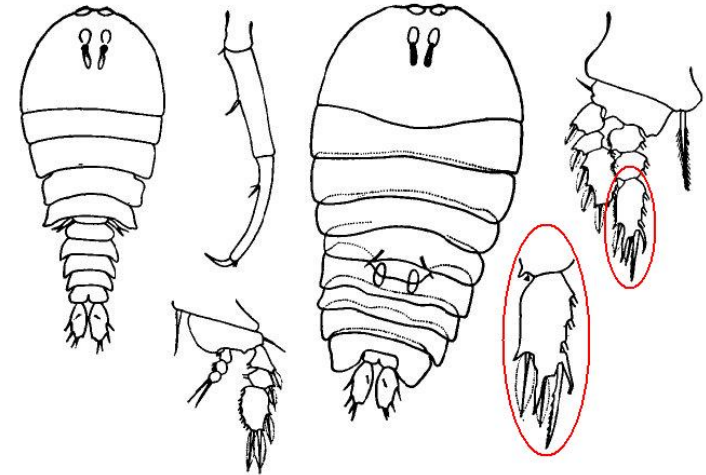
dorso-ventrally depressed,
foliaceous, well-developed lens

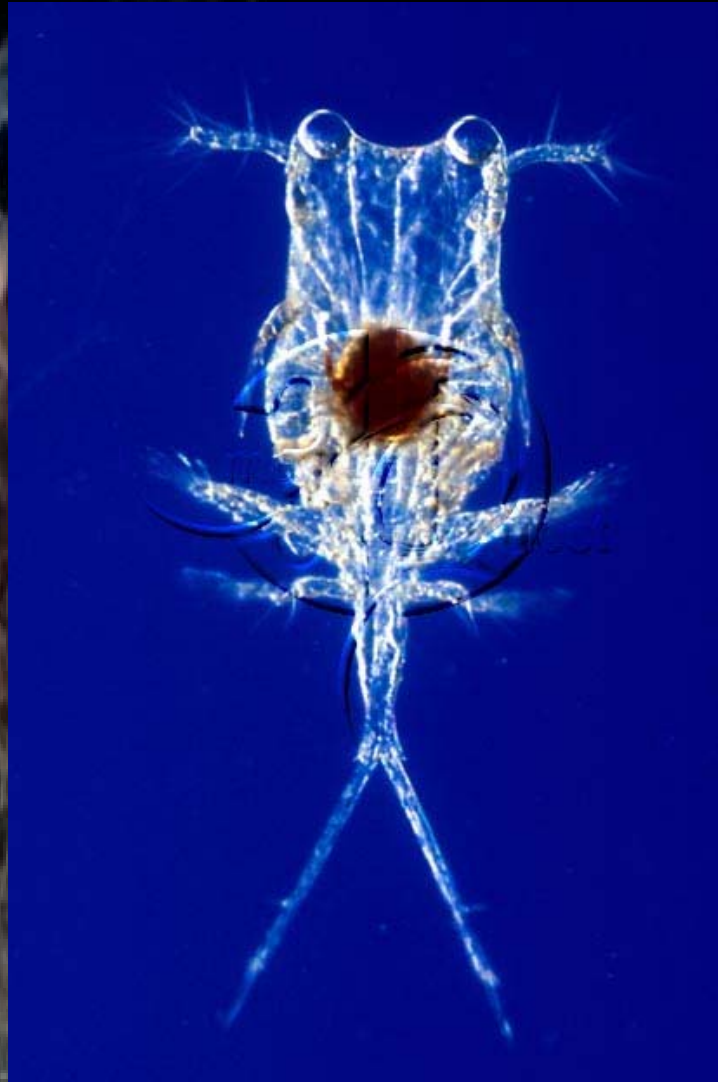
2.2.2.2 *Copilia*

C. mirabilis

♀ prosome subrectangular

♂ caudal rami elongate



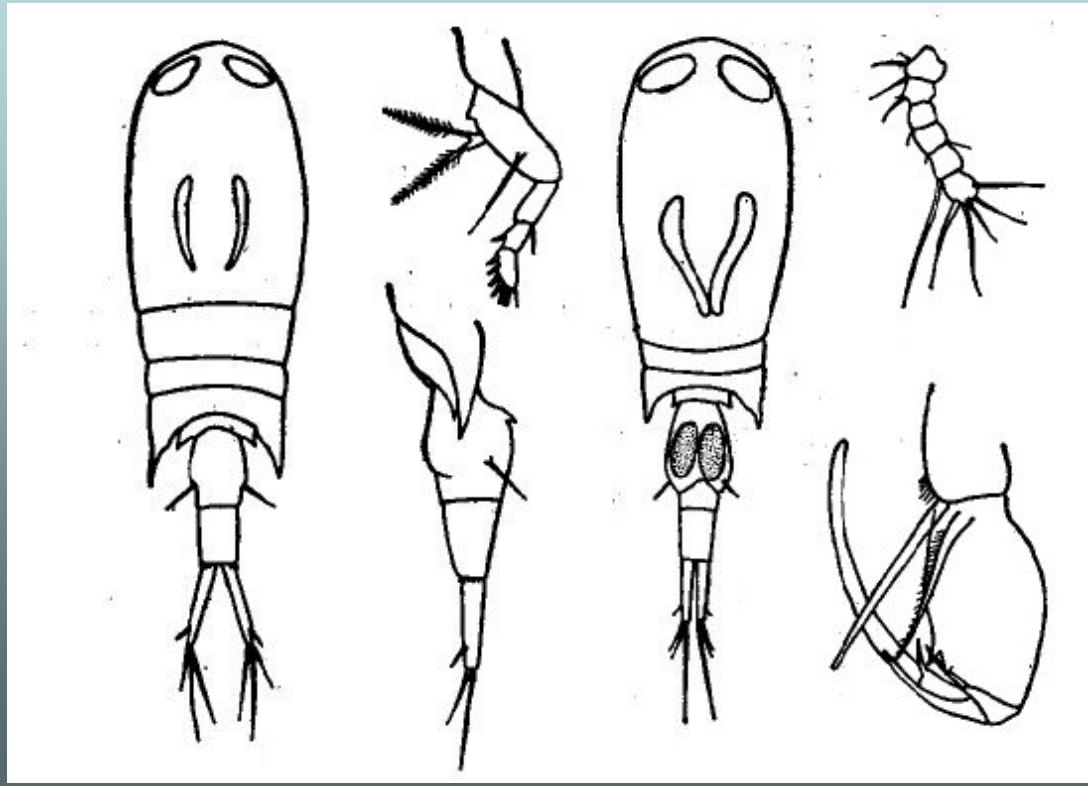


2.2.3 Family Corycaeidae

pair of lenses

Corycaeus

C. affinis



2.3 Order Harpacticoida

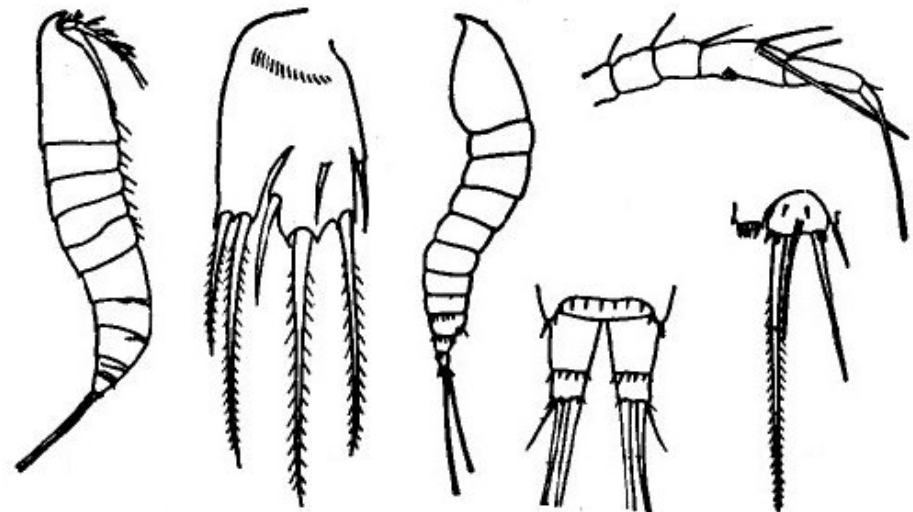
2.3.1 Family Ectinosomidae

Microsetlla

rostrum bent ventrally, bill-like

M. norvegica

caudal setae very long



3 Biology and Significance



3.1 Biology

3.1.1 Distribution

3.1.2 Growth and Body Size

3.1.3 Feeding

3.1.4 Reproduction and Development

3.1.5 Dormancy

3.1.6 Bioluminescence

3.1.7 Parasitism

3.2 Significance

3.1.1 Distribution

Horizontal distribution

Vertical distribution

Seasonal distribution

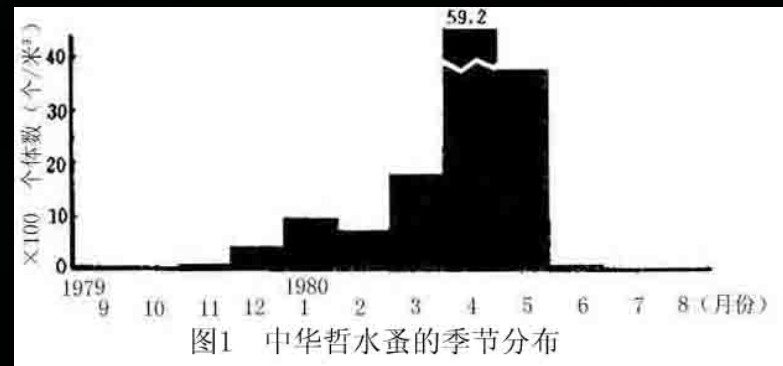
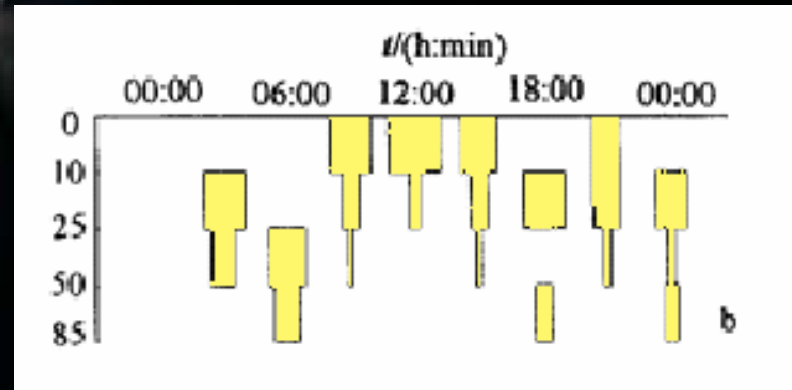
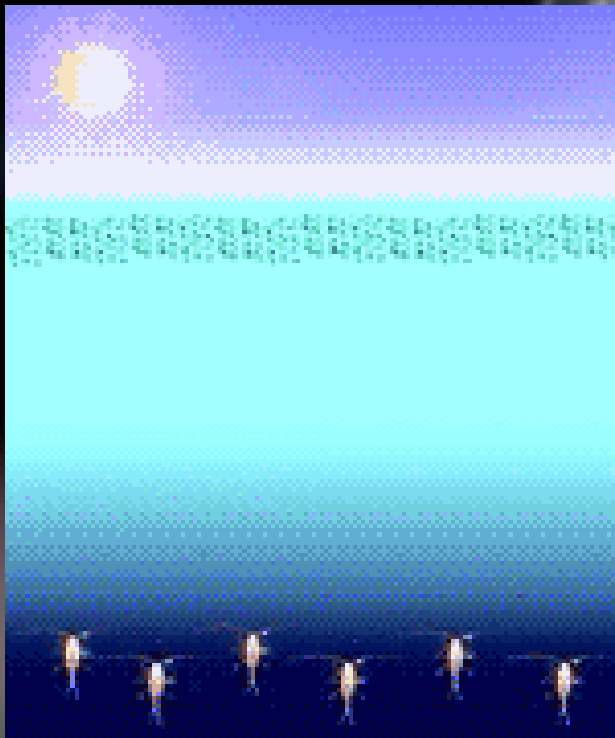
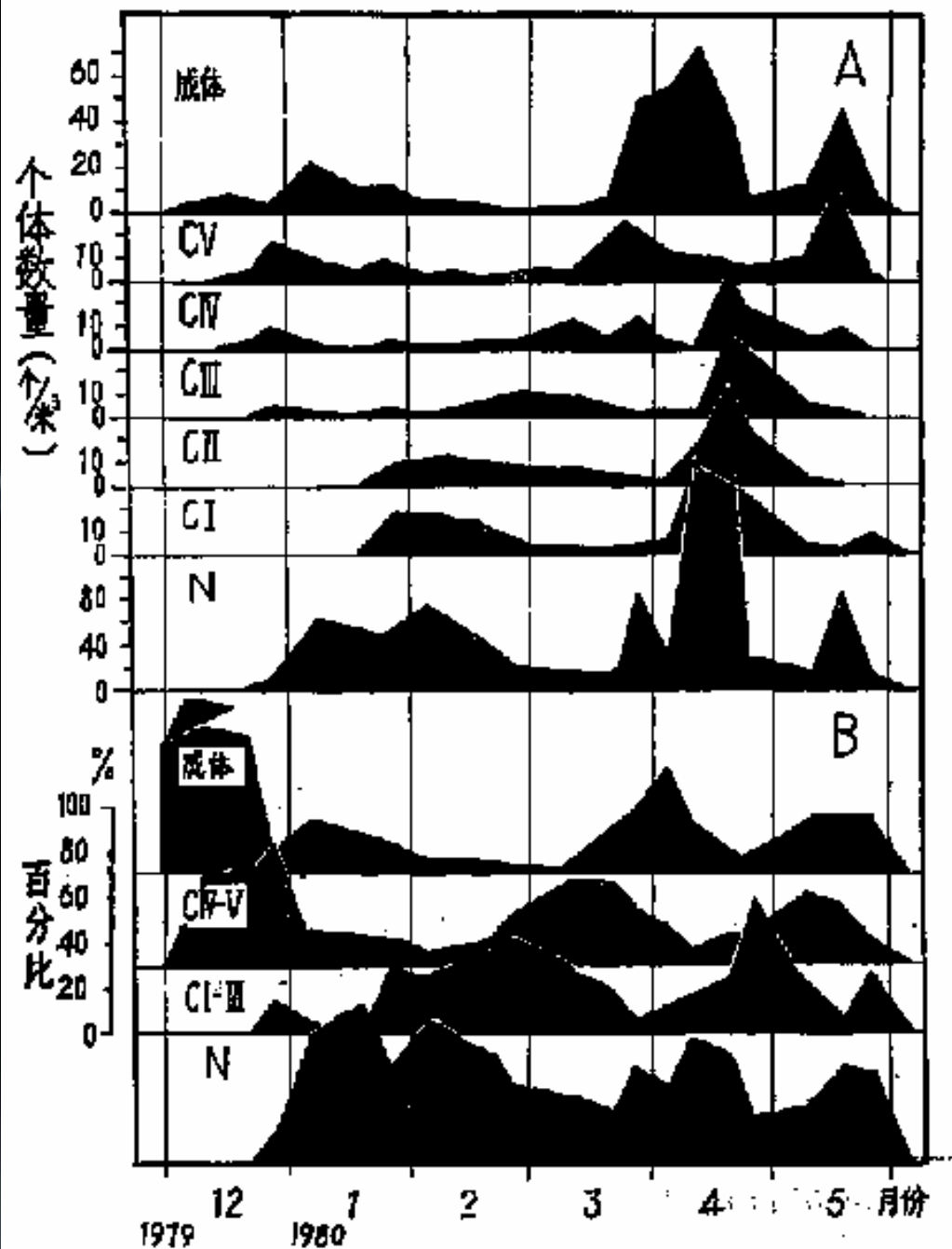
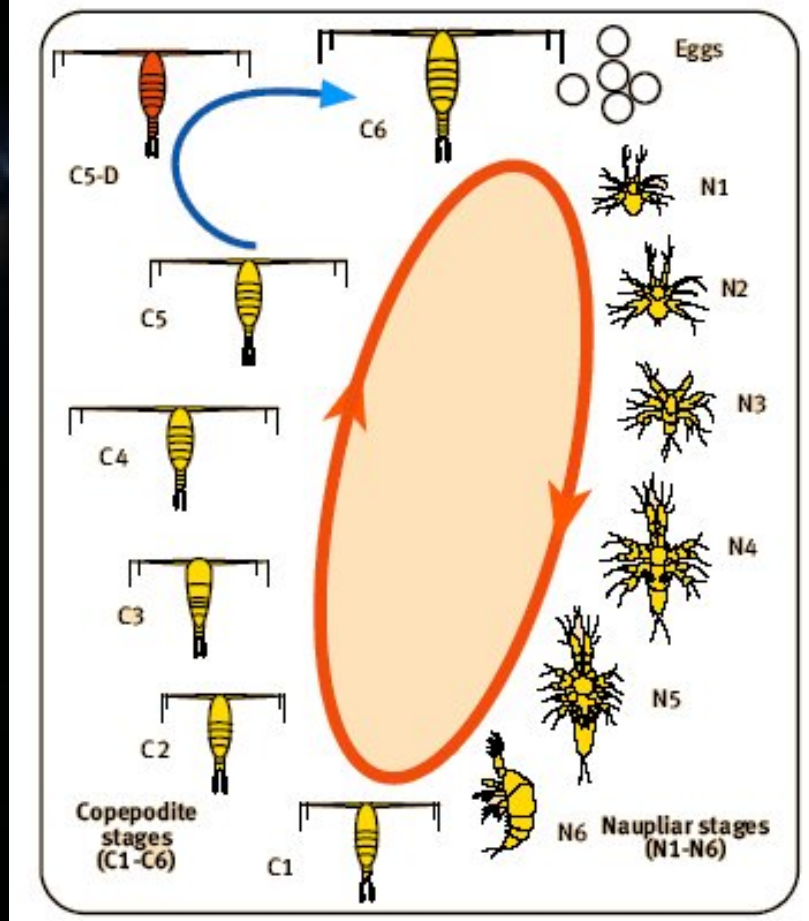


图1 中华哲水蚤的季节分布



中华哲水蚤世代划分



3.1.2 Growth and Body Size

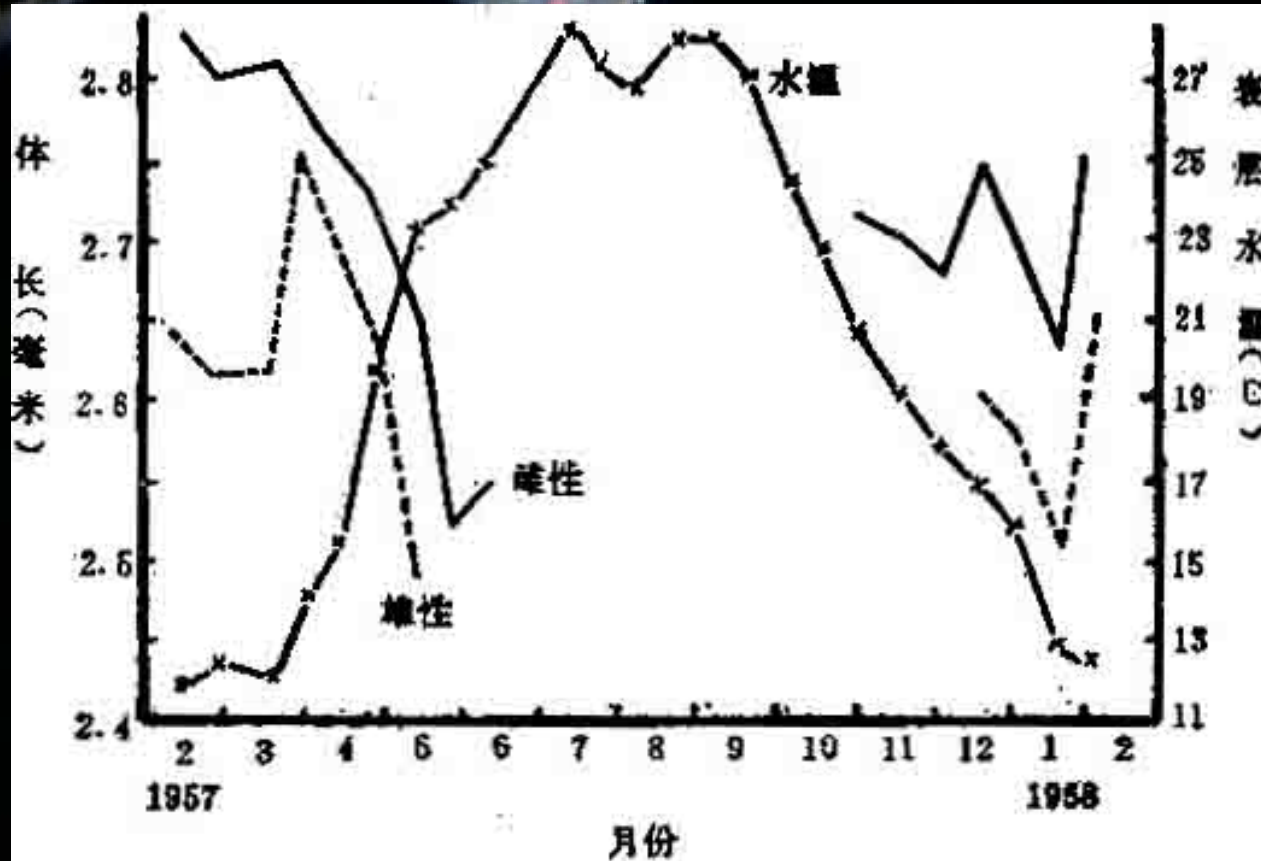
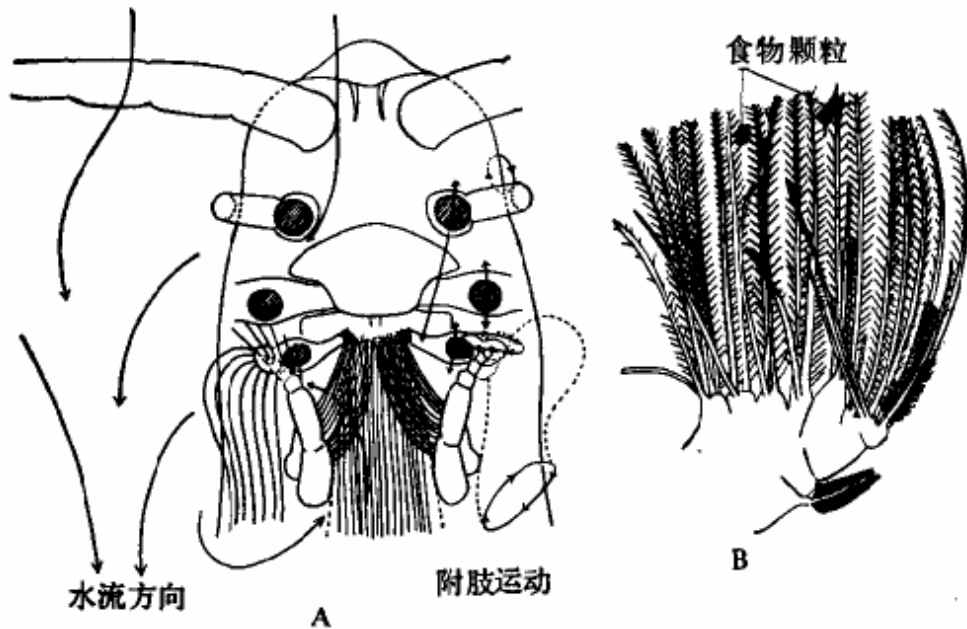


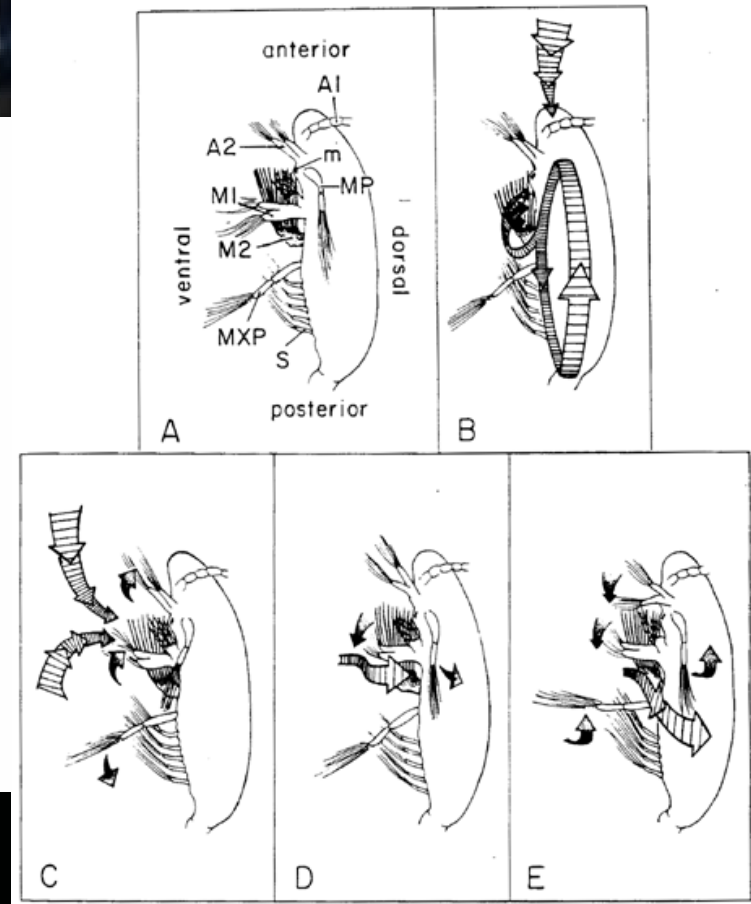
图6 厦门港中华哲水蚤个体大小的季节变化

3.1.3 Feeding

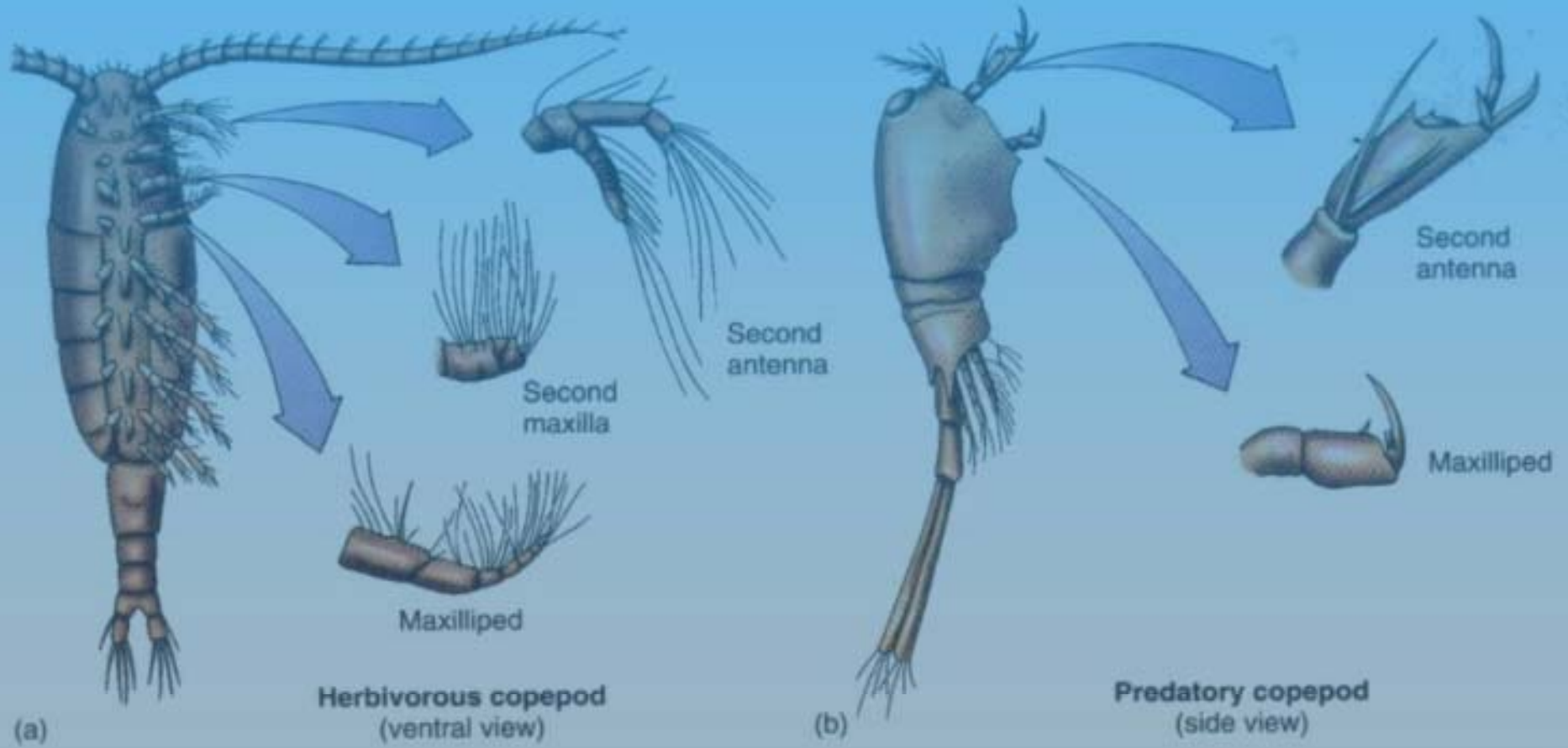
filter or predator

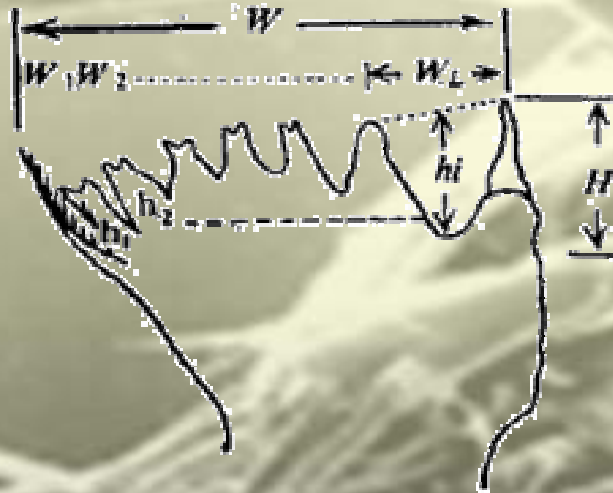


Filter Feeding



herbivorons
carnivorons
omnivorons





$$E.I. = \sum \left(\frac{w}{W} \cdot \frac{h}{H} \cdot 10^4 \right) / N$$

- E.I ≤ 500 filtering feeders
- 500 < E.I ≤ 900 omnivorous feeders
- E.I > 900 carnivorous



郑小衍, 郑重 (1989) 对九龙江口
13种桡足类大颚齿形态与食性关系
研究中, 将食性划分为

哲水蚤类食性

捕食 (E.I.>1700或2000)

杂食 (E.I.<1700或2000)

滤食 (E.I.<800)

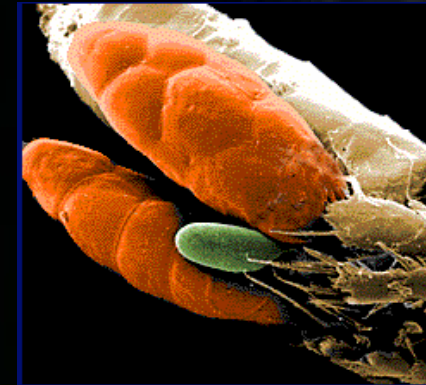
捕食 (E.I.>800)



3.1.4 Reproduction and Development

- Depositing eggs freely
- Carrying ovisacs
- Depositing sticky eggs

egg nauplius copepodid



Robertgurneya similis

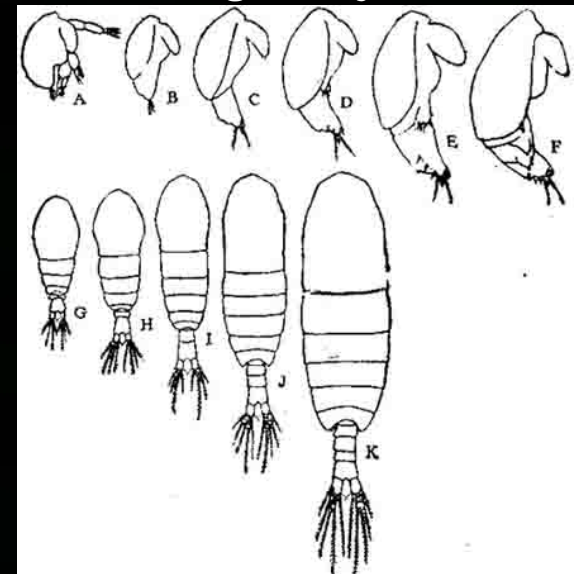


图5 中华哲水蚤的幼体发育

3.1.5 Dormancy

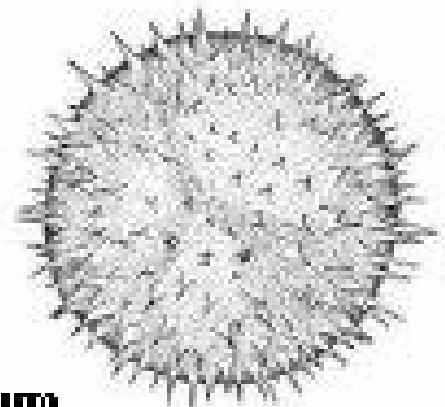
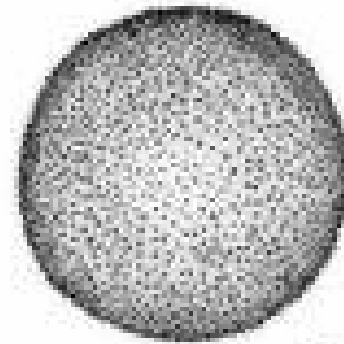
Diapause

Resting egg

Diapause egg

Subitaneous egg

Delayed hatching egg



50 μm



Seasonal distribution and larvae diapause of *Calanus finmarchicus*

