

**Key to the *Photis* (Amphipoda: Isaeidae) of the Southern California Bight**  
**MALES**  
 (Modified from J.L. Barnard, 1962 and K.E. Conlan, 1983)

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- 1a. Articles 4 and 5 of pereopod 4 normal, slender ..... 2
- 1b. Articles 4 and 5 of pereopod 4 grossly enlarged ..... *Photis elephantis*
- 2a. Gnathopod 2, article 6 with defining tooth or process on posterior margin ..... 5
- 2b. Gnathopod 2, article 6 without defining tooth or process (though a spine may be present) ..... 3
- 3a. Gnathopod 1 convex (evenly curved) (?); coxae 2, 3, and 4 very long and strap-like; coxa 5 large and triangular; gnathopod 2 excavate, defining corner quadrate ..... *Photis* sp A
- 3b. Gnathopod 1, palm concave or excavate; coxae 2 through 5 of normal size and shape; gnathopod 2 not as above ..... 4
- 4a. Coxa 1 antero-distally produced into small knob, with a fan of long stiff setae; gnathopods 1 and 2 "stepped" (deeply excavate, palms vertical), each with large defining spine ..... *Photis* sp C
- 4b. Coxa 1 not produced and without fan of setae; gnathopod 1 concave; gnathopod 2, palm long, oblique, with two small, blunt palmar teeth ("protuberances"), and a small defining spine (**female unknown**) ..... *Photis linearmanus*
- 5a. Gnathopod 2, palm transverse (defining tooth extends to, or beyond, a line perpendicular to dactyl hinge) ..... 6
- 5b. Gnathopod 2, palm oblique (defining tooth falls short of line perpendicular to dactyl hinge) ..... 16
- 6a. Gnathopod 1, article 5 subequal to article 6; gnathopod 2, palm with single defining tooth (palmar tooth present or absent) ..... 7
- 6b. Gnathopod 1, article 5 longer than article 6; gnathopod 2, palm with double defining tooth mounted on a process that is cryptically separated from the hand, and produced medially (Note: in specimens < 2.5 mm, the palmar process may not be distinctly separate from the rest of the palm, though it will be produced medially) ..... *Photis bifurcata*

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- 7a. Gnathopod 2, inner margin of the dactyl sinuous or notched, but lacking a tooth or medial swelling (Note: the dactyl of *Photis* sp OC1 and *P. californica* may appear thick throughout most of its length, narrowing distally, but it is not swollen medially) ..... 10
- 7b. Gnathopod 2, inner margin of the dactyl with distinct tooth or medial swelling (the latter in specimens < 5.0 mm) ..... 8
- 8a. Gnathopod 2, dactyl with blunt median tooth and large, distally upturned palmar tooth (specimen > 5.0 mm), or dactyl clearly swollen medially, narrowed distally and palmar tooth anvil shaped (with raised, flat surface opposite defining tooth); antenna 2, article 3 strongly geniculate (permanently bent downward); distinct pigment spot present on coxa 5 and antero-distal margin of gnathopod 1, article 6, just below dactyl ..*Photis brevipes*
- 8b. Gnathopod 2, dactyl with small, square median tooth, rest of dactyl evenly tapering; palmar tooth tapered (without raised, flat surface); antenna 2, article 3 not geniculate; coxa 5 and gnathopod 1, article 6 without pigment spot ..... 9
- 9a. Gnathopod 1, palm excavate; coxa 1 ventral margin flat; gnathopod 2, article 2 broad ..... *Photis parvidons*
- 9b. Gnathopod 1, palm convex; coxa 1 ventral margin rounded; gnathopod 2, article 2 narrow (**female unknown**) ..... *Photis cf. parvidons*
- 10a. Gnathopod 1, palm concave or sinuous ..... 11
- 10b. Gnathopod 1, palm convex or flat ..... ~~11~~ 14
- 11a. Gnathopod 1, article 5 subequal to article 6, posterior margin elongate (approximately one-half length of anterior margin) and unproduced; article 6 sinuous, defining corner rounded; gnathopod 2, article 6 broad (approximately 1.5 times longer than wide), palmar tooth not square (rounded or tapered); head without anterior patch of pigment dorsally ..... 12
- 11b. Gnathopod 1, article 5 shorter than article 6, posterior margin narrow and produced (lobate); article 6 distinctly concave, defining corner acute or quadrate; gnathopod 2, article 6 elongate (approximately 2 times longer than wide), palmar tooth squared; head with distinct anterior and posterior pigment patches dorsally ..... *Photis macinerneyi*

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MALES

(Modified from J.L. Barnard, 1962 and K.E. Conlan, 1983)

- 12a. Gnathopod 1, anterior margin of article 5 bare or weakly setose (0-3 setae, except in specimens > 5.0 mm); article 2, posterior margin setose; gnathopod 2, inner margin of dactyl swollen, distinctly narrowed distally; palmar tooth tapered (but not anvil shaped) or broadly rounded; coxae densely setose (> 10 setae along ventral margin) ..... 13
- 12b. Gnathopod 1, anterior margin of article 5 densely setose (> 6 setae or setal bundles in specimens  $\leq$  3.0 mm); article 2, posterior margin bare; gnathopod 2, inner margin of dactyl evenly curved, not narrowed distally; palmar tooth anvil shaped; coxae weakly setose (< 10 setae along ventral margin) ..... *Photis* sp SD7
- 13a. Gnathopod 2, palmar tooth large, distally upturned or broadly rounded (in specimens < 3.0 mm); body often covered with many pigment spots (blotchy), head with distinct pigment patch dorsally along posterior margin, antenna 1 without line of pigment in peduncular articles; gnathopod 1, article 5, anterior margin weakly setose (may be dense in specimens > 5.0 mm) ..... *Photis* sp OC1
- 13b. Gnathopod 2, palmar tooth tapered; body without numerous pigment spots, head without pigment patch dorsally, antenna 1 with line of pigment in peduncular articles; gnathopod 1, article 5, anterior margin bare ..... *Photis californica*
- 14a. Gnathopod 1, palm convex; gnathopod 2 weakly excavate, palmar tooth extremely reduced, tapered, and blunt, not extending beyond dactyl hinge; coxa 5 with pigment spot (specimens < 3.0 mm) ..... 15
- 14b. Gnathopod 1, palm flat (to minutely excavate); gnathopod 2 deeply excavate, palmar process tapered, extending beyond dactyl hinge; coxa 5 without pigment spot ..... *Photis conchicola*
- 15a. Gnathopod 2, palm broad, nearly vertical, excavation shallow, its margin sinuous, the defining tooth poorly developed, the defining corner acutely produced; antero-distal margin of gnathopod 1, article 6, with pigment spot just below dactyl) ..... *Photis brevipes* (immature)
- 2
- 15b. Gnathopod 1, palm distinctly excavate, excavation "V" shaped, defining tooth well developed; antenna 1, peduncular articles with line of pigment ..... *Photis californica* (immature)

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 (Modified from J.L. Barnard, 1962 and K.E. Conlan, 1983)

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- 16a. Gnathopod 1 convex; eye "normal" sized ..... 19
- 16b. Gnathopod 1 scarcely sinuous to distinctly concave; eye large for the genus ..... 17
- 17a. Gnathopod 1, palm scarcely sinuous; gnathopod 2, dactyl inner margin without tooth; palmar excavation narrow (i.e., distance between defining tooth and opposing margin of palmar process is less than one-third the width of article 6) ..... 18
- 17b. Gnathopod 1 palm distinctly excavate; gnathopod 2, dactyl with small, proximal tooth on inner margin; palmar excavation wide (i.e., distance between defining tooth and opposing margin of palmar process is approximately one-half the width of article 6) .....  
 ..... *Photis macrotica*
- 18a. Palmar tooth poorly produced, not extending beyond dactyl hinge; specimen from depths  $\leq 100$  m, length  $\leq 2.5$  mm ..... *Photis macrotica* (immature)
- 18b. Palmar tooth produced beyond dactyl hinge; specimen from depths  $\geq 300$  m .....  
 ..... *Photis chiconola*
- 19a. Gnathopod 2, palm not noticeably long, nor strongly oblique, bearing only one palmar tooth, in addition to the defining tooth ..... 20
- 19b. Gnathopod 2, palm long and strongly oblique, bearing two teeth: a large tooth near the dactyl hinge, and smaller median tooth, in addition to the defining tooth... *Photis viuda*
- 20a. Gnathopod 2, palmar tooth tapered, or blunt and barely visible; gnathopod 1, article 5 sub-equal to article 6, posterior margin less than or equal to one-half the length of anterior margin ..... 21
- 20b. Gnathopod 2, palmar tooth square or blunt; gnathopod 1, article 5, longer than article 6, posterior margin greater than one-half the length of anterior margin ..... *Photis lacia*
- 21a. Eye lobe, blunt and triangular (dorsal and ventral margin straight or nearly so); ventral margin of coxa 1 not scalloped; gnathopod 2, palmar tooth poorly developed (blunt or absent); specimen  $< 2.0$  mm ..... 22
- 21b. Eye lobe distinctly acute (dorsal and ventral margins concave); ventral margin of coxa 1 scalloped; gnathopod 2, palmar tooth tapered ..... *Photis* sp B

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- 22a. Antenna 2, article 3 geniculate; coxa 5 with pigment spot and peduncular articles of antenna 1 often with line of pigment ..... *Photis californica* (immature)
- 22b. Antenna 2, article 3 not geniculate; body pigment, diffuse, coxa 5 without pigment spot and peduncular articles of antenna 1 unpigmented ..... *Photis parvidons* (immature)

Note: Male of *Photis* sp E SCAMIT are undescribed.

DRAFT NOT FOR DISTRIBUTION

1 ♂ seen Fairbairn

is *P. laevis* <sup>ok</sup>

*Photis* sp LA1 bombs here.

It has straight oblique G1 palm, normal eye, G2 has large defining tooth separated from palm by narrow V shaped groove. No palmar tooth, mid palmar area extended as a serrulate lamella, dactyl has no tooth, narrow w/step distally. coxae of 3, 4, 5 darkly pigmented. Animal otherwise white, glossy. About size of *P. cal.*

**Key to the *Photis* (Amphipoda: Isaeidae) of the Southern California Bight**  
**FEMALES**  
 (Modified from Conlan, 1983)

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- 1a. Articles 4 and 5 of pereopod 4 normal, slender ..... 2
- 1b. Articles 4 and 5 of pereopod 4 grossly enlarged ..... *Photis elephantis*
- 2a. Gnathopod 2, palm without palmar tooth, or defining tooth (though a spine may be present) ..... 3
- 2b. Gnathopod 2, palmar process emarginate, and defining tooth large ..... *Photis* sp E
- 3a. Gnathopod 2, palm convex to nearly flat ..... 4
- 3b. Gnathopod 2, palm excavate or sinuous ..... 8
- 4a. Coxae 2, 3, and 4 very long and strap-like; coxa 5 large and triangular ..... *Photis* sp A
- 4b. Coxae 2 through 4 normal, not long and strap-like; coxa 5 not large and triangular ... 5
- 5a. Eye lobe distinctly acute (dorsal and ventral margins concave); eye small and diffuse; ventral margin of coxa 1 scalloped ..... *Photis* sp B
- 5b. Eye lobe blunt, triangular (dorsal and ventral margin straight or nearly so); eye normal; ventral margin of coxa 1 not distinctly scalloped ..... 6
- 6a. Coxa 1 antero-distally produced into small knob, with a fan of long stiff setae; gnathopods 1, palm scarcely sinuous; gnathopods 1 and 2 with large, stout defining spine; antenna 1, peduncular article 1 short, barely exceeding eye lobe ..... *Photis* sp C
- 6b. Coxa 1 not produced and without fan of setae; gnathopod 1 convex; gnathopods 1 and 2, defining spine ordinary; antenna 1, peduncular article 1 long, exceeding eye lobe by one-half its length ..... 7
- 7a. Gnathopod 1, article 5 longer than article 6; posterior margin more than one-half anterior margin; coxae 1-5 often with vertical band of pigment; body without numerous pigment spots ..... *Photis lacia*
- 7b. Gnathopod 1, article 5 shorter than article 6; posterior margin one-third anterior margin; body with numerous pigment spots (blotchy); head with distinct anterior and posterior pigment patches dorsally ..... *Photis macinerneyi*

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**FEMALES**  
**(Modified from Conlan, 1983)**

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- 8a. Eye large for the genus ..... 9
- 8b. Eye "normal" ..... 10
- 9a. Gnathopod 1, palm concave or sinuous; specimen from depths  $\geq 300$  m .....  
..... *Photis chiconola*
- 9b. Gnathopod 1, palm convex; specimen from depths  $\leq 100$  m ..... *Photis macrotica*
- 10a. Gnathopod 1, palm concave or sinuous (the latter obvious in specimens  $\geq 2.5$  mm)..11
- 10b. Gnathopod 1, palm convex, flat or scarcely sinuous (the latter apparent in specimens  
 $> 5.0$  mm at 100X magnification) ..... 13
- 11a. Gnathopod 2, palm distinctly concave, defining corner rounded; body and head without  
pigment patches ..... 12
- 11b. Gnathopod 2 scarcely oblique, palm nearly vertical, weakly excavate, its margin sinu-  
ous, the defining corner acutely produced; body often covered with many pigment spots  
(blotchy), head with distinct pigment patch dorsally along posterior margin .....  
..... *Photis* sp OC1
- 12a. Gnathopod 2, article 2 broad (width more than one-half length, W:L = 0.6), strongly  
produced antero-distally; gnathopod 1, article 2, broad, posterior margin convex antenna  
1, peduncular articles with pigment stripes; coxa 5 with pigment spot.....  
..... *Photis californica*
- 12b. Gnathopod 2, article 2 narrow, (width less than one-half length, W:L = 0.4), not pro-  
duced antero-distally or only weakly so; gnathopod 1, article 2, narrow, posterior  
margin nearly straight; antenna 1, peduncular articles without pigment stripes; coxa 5  
without pigment spot ..... *Photis parvidons*
- 13a. Gnathopod 2, article 2 strongly produced antero-distally; coxae 1-5 densely setose  
( $> 15$  setae along ventral margin; setae approximately equal to or exceeding width of  
coxae)..... 14
- 13b. Gnathopod 2, article 2 not produced or weakly so; coxae 1-5 weakly setose ( $\leq 10$  setae  
along ventral margin; setae generally one-half to two-thirds width of coxae) ..... 15

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FEMALES  
(Modified from Conlan, 1983)**

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- 14a. Gnathopod 2 scarcely oblique, palm nearly vertical, weakly excavate, its margin sinuous, the defining corner acutely produced; antenna 2, article 3 strongly geniculate; distinct pigment spot present on coxa 5 and antero-distal margin of gnathopod 1, article 6, just below dactyl ..... *Photis brevipes*
- 14b. Gnathopod 2 distinctly oblique, excavate, defining corner not acutely produced; antenna 2, article 3 not strongly geniculate; pigment pattern otherwise ..... *Photis conchicola*
- 15a. Gnathopod 1, article 5 posterior margin short (less than one-third anterior margin) and produced (lobate); gnathopod 2 defining corner bulging ..... *Photis viuda*
- 15b. Gnathopod 1, article 5 posterior margin, normal (greater than one-third anterior margin) and unproduced; gnathopod 2 defining corner rounded, but not bulging ..... 16
- 16a. Gnathopod 1, palm oblique, elongate ( $\geq$  two-thirds the length of anterior margin), nearly flat; article 2, posterior margin setose (each over twice the width of article 2) .....  
..... *Photis bifurcata*
- 16b. Gnathopod 1, palm scarcely sinuous, approximately one-third to one-half the length of anterior margin; article 2 bare, except for 1-4 very short setae (each less than one-half the width of article 2) ..... *Photis* sp SD7

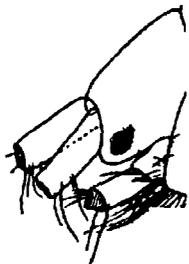
**Note: Females of *Photis linearmanus* and *Photis cf parvidons* are still unknown.**

# Key to the *Photis* from the Southern California Bight

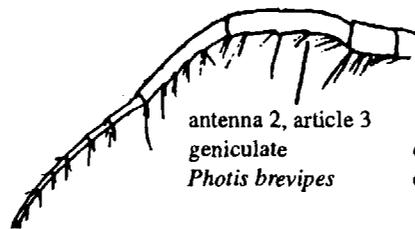
## Figure page



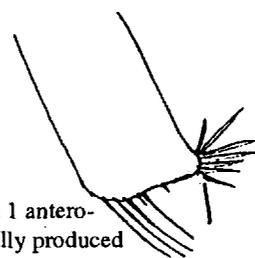
eye large  
*Photis macrotica*



eye normal  
*Photis californica*



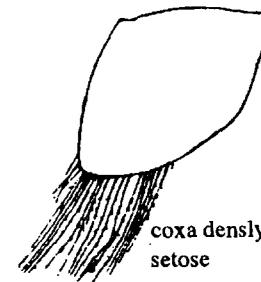
antenna 2, article 3  
geniculate  
*Photis brevipes*



coxa 1 antero-  
distally produced  
*Photis sp C*

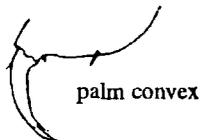


coxa weakly  
setose

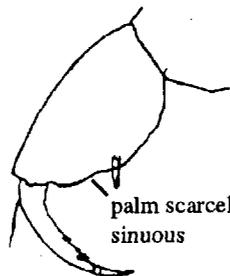


coxa densely  
setose

### Gnathopod 1



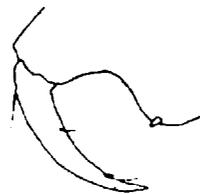
palm convex



palm scarcely  
sinuous



palm sinuous  
posterior margin elongate



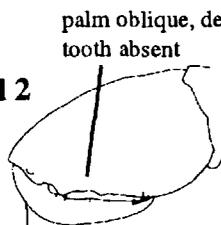
palm concave, defining  
corner rounded



*Photis brevipes*  
(immature)

dactyl with median swelling, palmar  
excavation narrow, palmar tooth  
anvil shaped

### Gnathopod 2 MALE



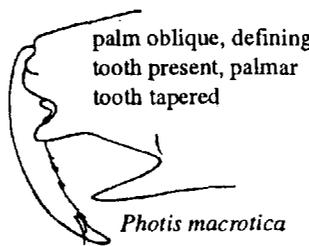
palm oblique, defining  
tooth absent

*Photis linearmanus*



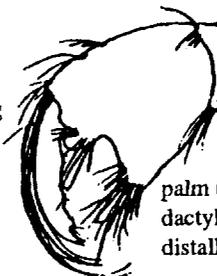
palm "stepped",  
defining tooth absent

*Photis sp C*



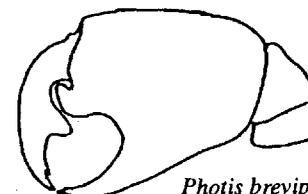
palm oblique, defining  
tooth present, palmar  
tooth tapered

*Photis macrotica*



palm transverse,  
dactyl narrowed  
distally

*Photis californica*



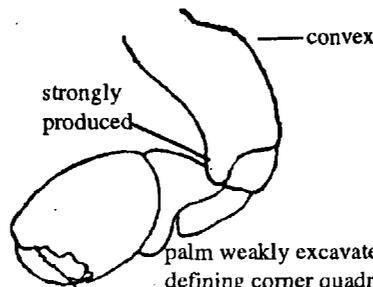
*Photis brevipes*

dactyl with median tooth,  
palmar excavation wide

### Gnathopod 2 FEMALE



palm oblique, flat  
*Photis lacia*

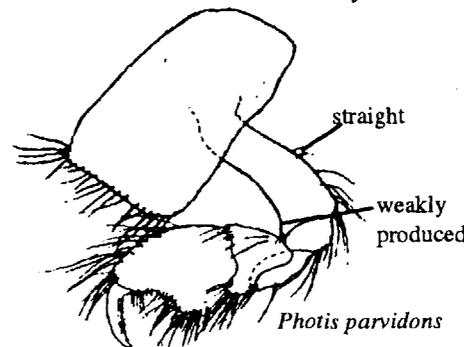


strongly  
produced

convex

palm weakly excavate,  
defining corner quadrate

*Photis OCI*

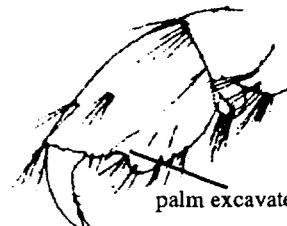


straight

weakly  
produced

*Photis parvidons*

palm, concave, defining corner rounded



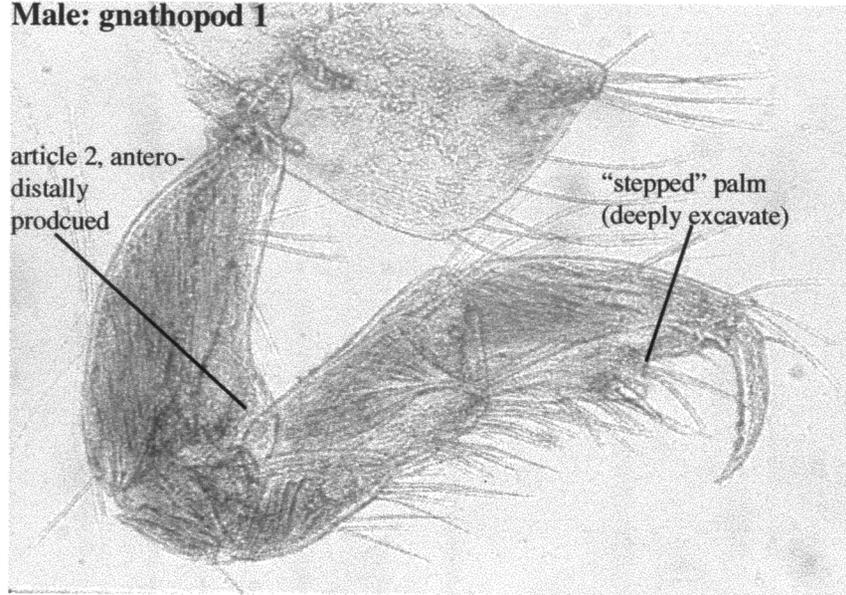
palm excavate

*Photis bifurcata*

# *Photis* sp C MEC

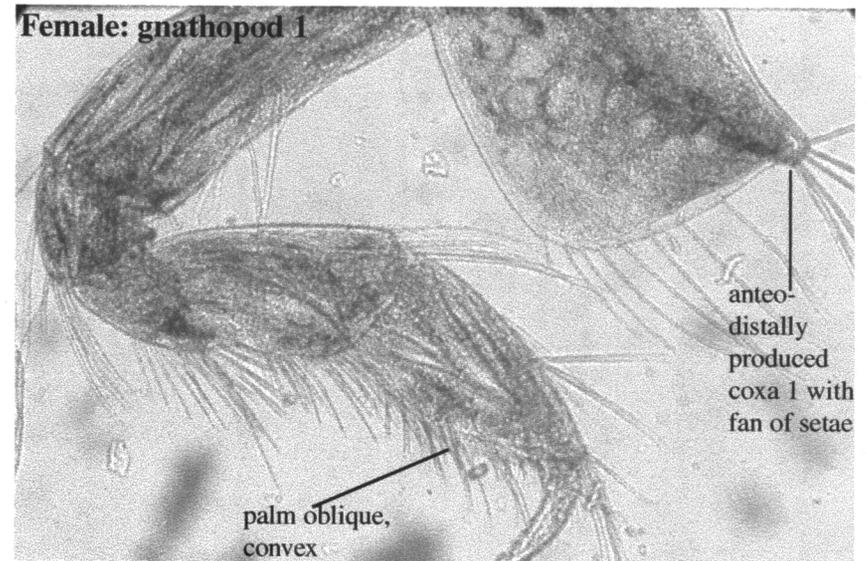
Male specimen: 3.5 mm

## Male: gnathopod 1

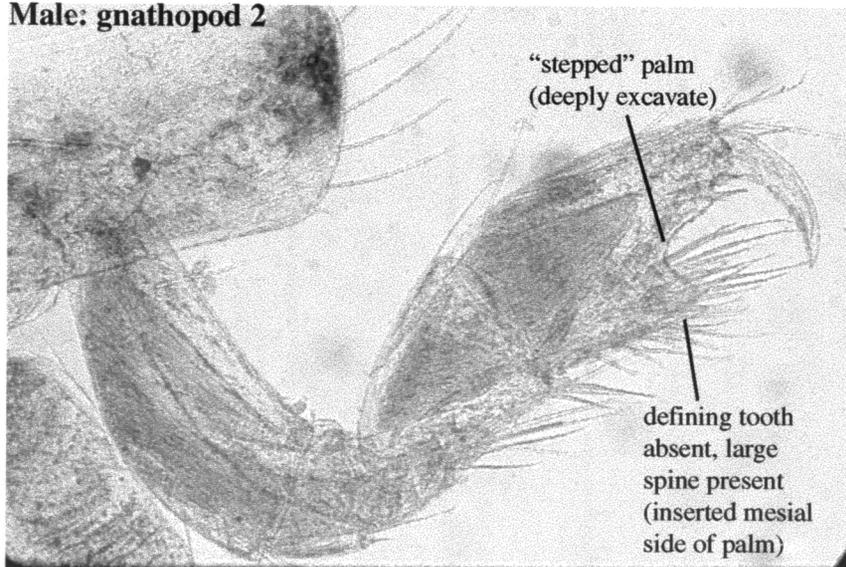


Female specimen: 4.25 mm

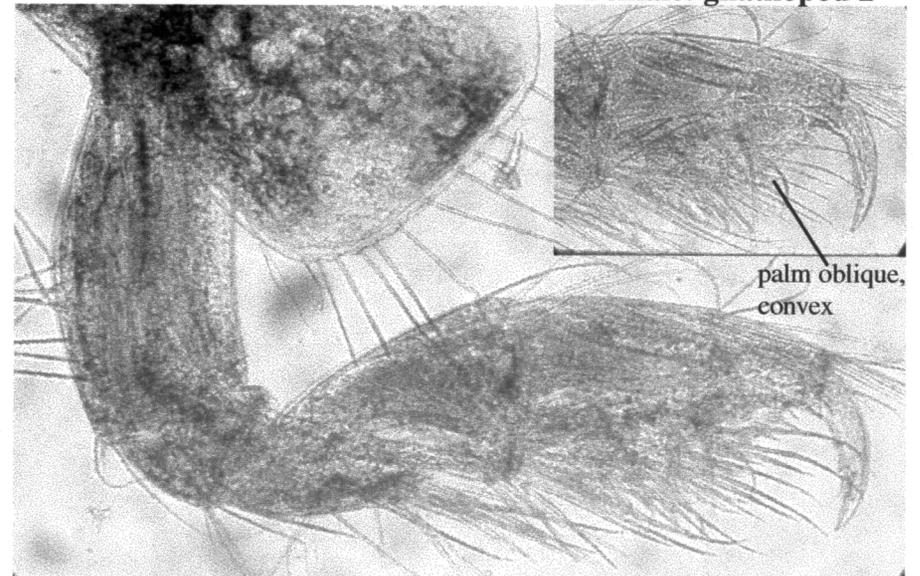
## Female: gnathopod 1



## Male: gnathopod 2



## Female: gnathopod 2



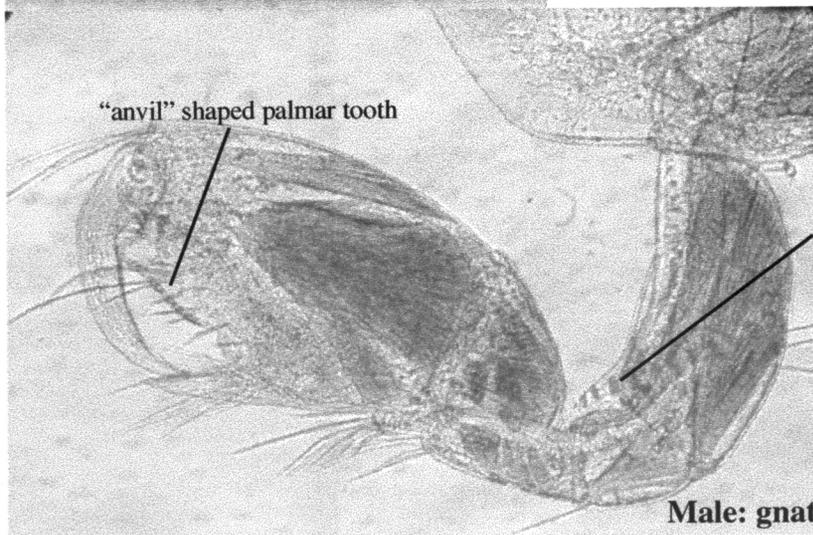
Malespecimen: 2.5 mm

**Male: gnathopod 1**



article 5, longer than article 6, anterior margin densely setose

palm excavate



"anvil" shaped palmar tooth

antero-distally produced w/ stridulation ridges

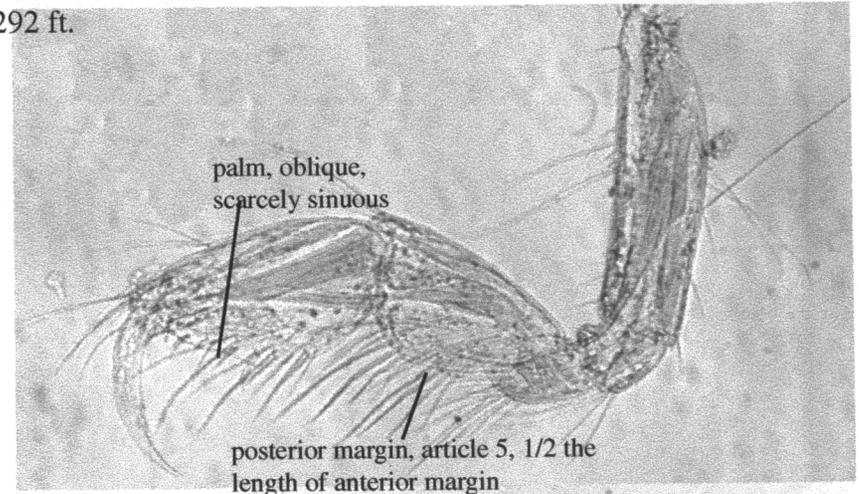
**Male: gnathopod 2**

***Photis* sp SD7**

specimens from station B-11 (1), 1/8/97, 292 ft.

Female specimen: 3.4 mm

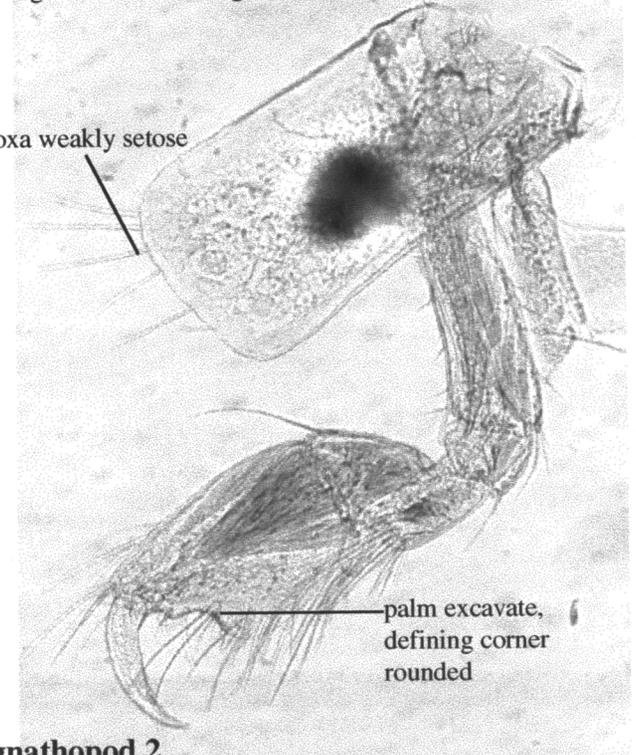
**Female: gnathopod 1**



palm, oblique, scarcely sinuous

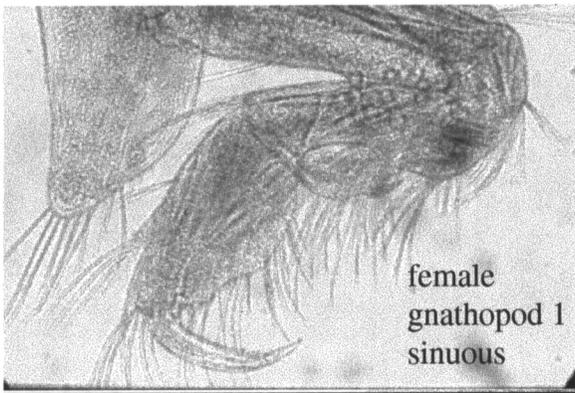
posterior margin, article 5, 1/2 the length of anterior margin

coxa weakly setose



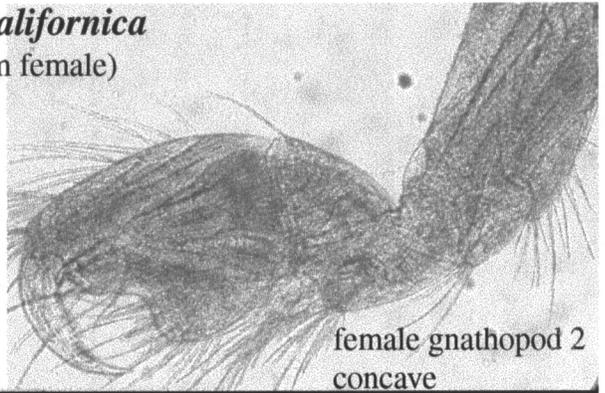
palm excavate, defining corner rounded

**Female: gnathopod 2**

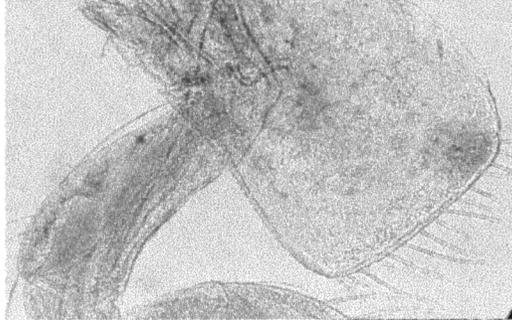


female  
gnathopod 1  
sinuous

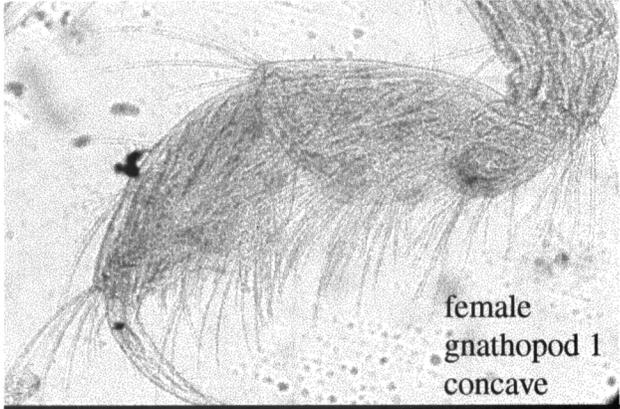
*Photis californica*  
(4.7 mm female)



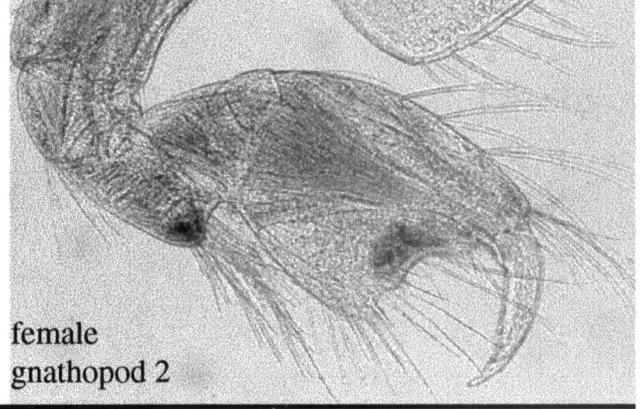
female gnathopod 2  
concave



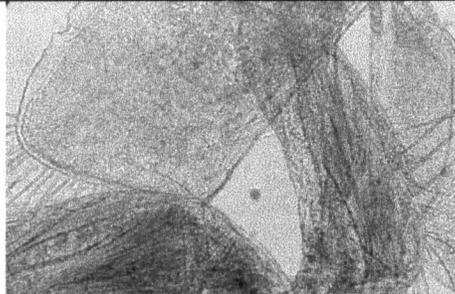
*Photis sp OC1 MEC*  
(5.75 mm female)



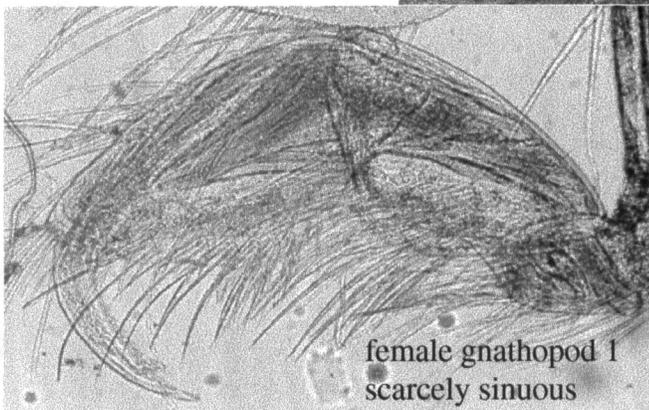
female  
gnathopod 1  
concave



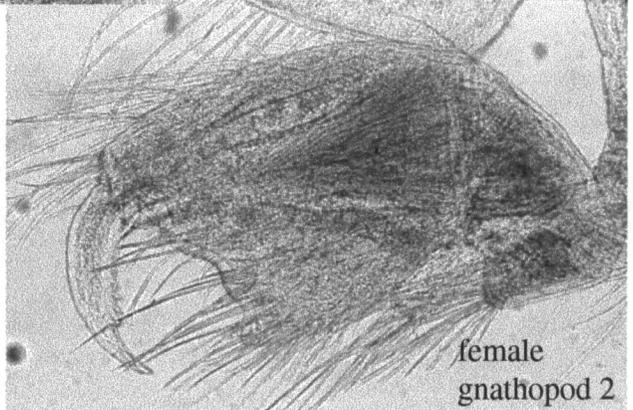
female  
gnathopod 2



*Photis brevipes*  
(5.6 mm female)



female gnathopod 1  
scarcely sinuous

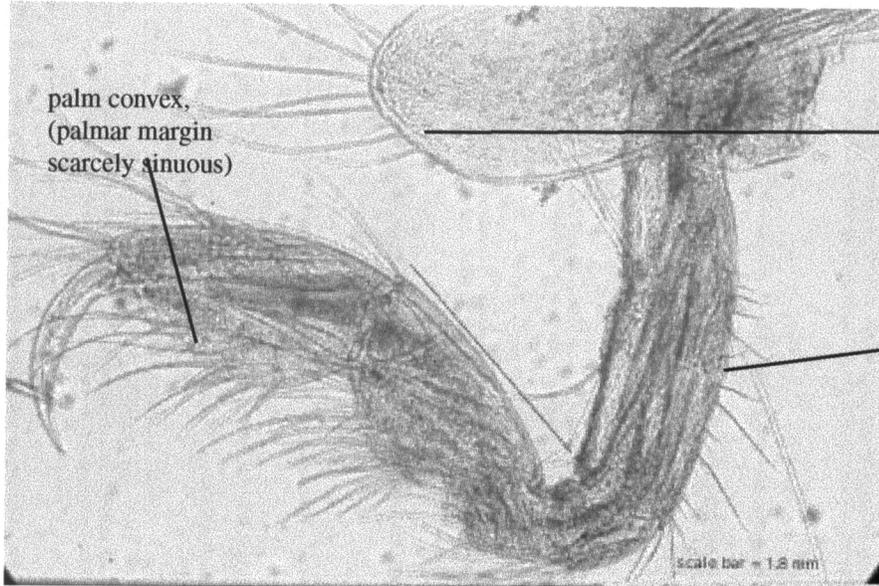


female  
gnathopod 2

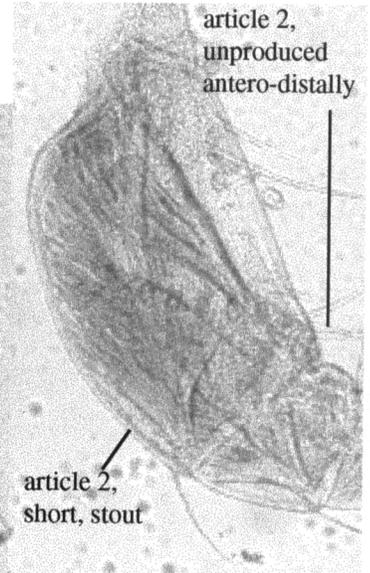
*Photis cf. parvidons*

Images from 3.5 mm male  
Station A-3 (3), 4 Oct 1994, 262 ft

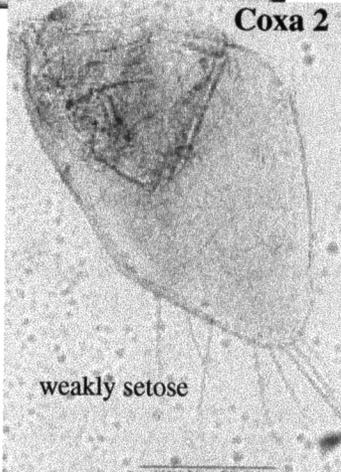
**Gnathopod 1**



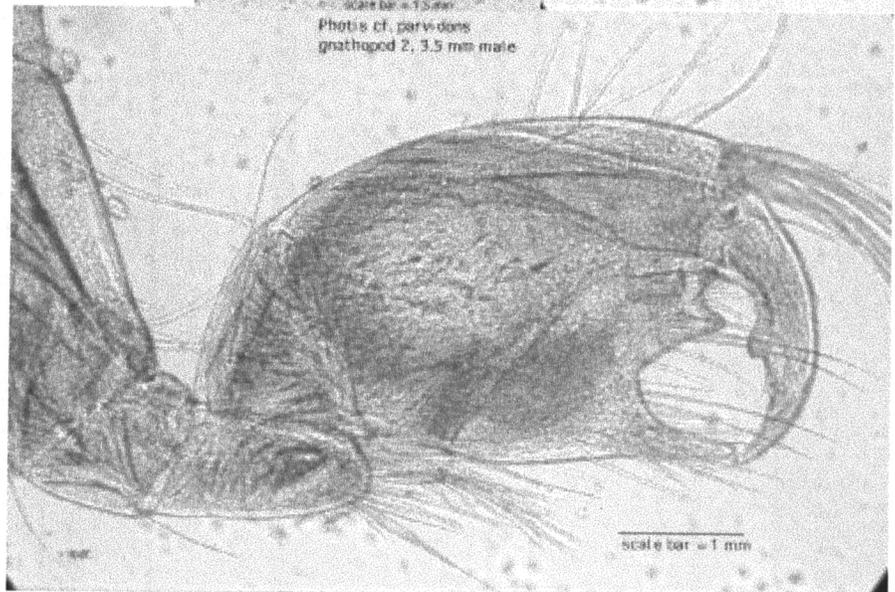
**Gnathopod 2**



**Coxa 2**



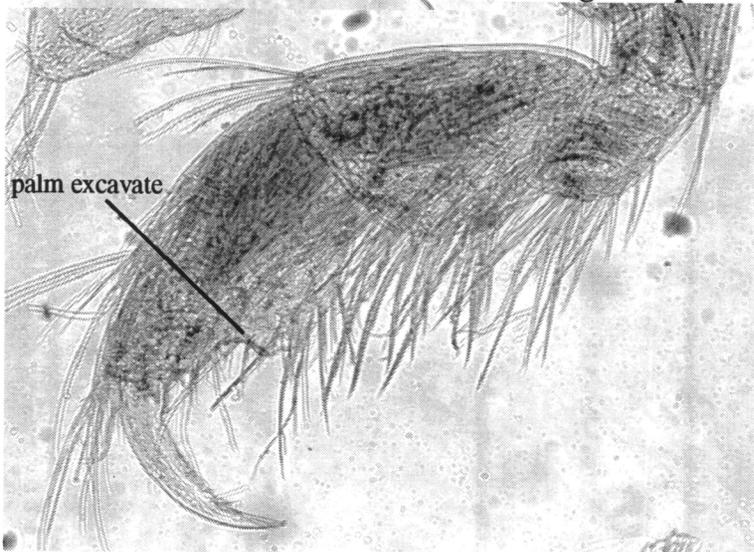
**Gnathopod 2**



**Male gnathopod 1**



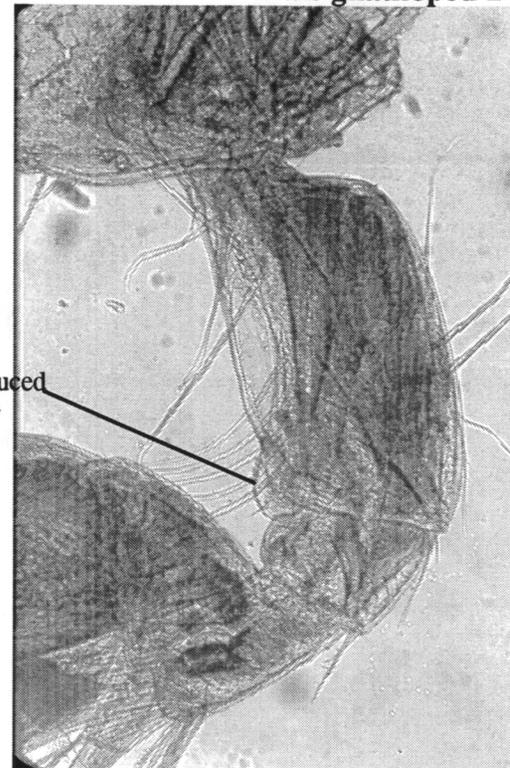
**Male gnathopod 1**



***Photis parvidons***

Images from 3.25 mm male  
Station E-14 (1), 9 Jan. 1997, 320 ft

**Male gnathopod 2**



**Male gnathopod 2**

