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*THE SPECIES OF LEBBEUS IN CALIFORNIA*

*(CRUSTACEA: CARIDEA: HIPPOLYTIDAE)*

by *Mary K. Wicksten*

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# The Species of *Lebbeus* in California (Crustacea: Caridea: Hippolytidae)

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ABSTRACT. Three species of the genus *Lebbeus* have been found in California. Of these, only *L. lagunae* has been observed in its natural habitat. This shrimp inhabits low intertidal to subtidal areas from Monterey Bay to Cortez Bank. In life, the colors of the animal provide camouflage among algae. Each ovigerous female carried 800 to 900 eggs.

The other two species of *Lebbeus* inhabit soft substrates. *Lebbeus washingtonianus* is a bathyal species recorded from Santa Rosa Island to San Clemente Island at depths of 827 to 1818 m. *Lebbeus polaris* was collected in the Monterey submarine canyon at 954-1044 m. A key to the species is provided.

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## INTRODUCTION

Members of the family Hippolytidae, commonly called grass shrimp or broken-backed shrimp, are abundant along the coast of California. Individuals of the genus *Lebbeus* White 1847 can be readily distinguished from other hippolytids in this area by the possession of seven segments in the carpus of the second pereopods, a single supraorbital spine, a third maxilliped without an exopod, and both antennal and pterygostomial spines, but no branchiostegal spine (Holthuis, 1947).

Prior to recent environmental impact surveys and collecting with SCUBA gear, few individuals of the species of *Lebbeus* were collected in California. During examination of collections at the Allan Hancock Foundation and the California Academy of Sciences, series of specimens of *L. lagunae* and *L. washingtonianus* were found, along with the first specimen of *L. polaris* from California. *Lebbeus lagunae* was observed by the writer in its natural habitat under water. This paper provides a key to these species and gives notes on their distribution, morphology, and natural history.

KEY TO THE SPECIES OF  
*LEBBEUS* IN CALIFORNIA

1. Rostrum shorter than eye, reduced to spine on frontal margin of carapace. Three spines on anterior dorsal midline of carapace  
..... *Lebbeus lagunae* (Fig. 1)
- Rostrum longer than eye, not reduced to spine on frontal margin of carapace. Two spines on anterior dorsal midline of carapace ..... 2
2. Rostrum less than two times as long as eye ..... *Lebbeus washingtonianus* (Fig. 2)
- Rostrum more than two times as long as eye ..... *Lebbeus polaris* (Fig. 3)

*Lebbeus lagunae* (Schmitt 1921)

Fig. 4

*Spirontocaris lagunae* Schmitt, 1921, p. 57, fig. 35, pl. 12: figs. 10, 11.

*Lebbeus lagunae*, Holthuis, 1947, pp. 9, 38.

*Lebbeus lagunae*, Carlton and Kuris, 1975, p. 403.

*California Records.* 36°37'N: in kelp bed off Hopkins Marine Station, Pacific Grove; 9.2 m; Mary K. Wicksten; July 29, 1976; 1 specimen.

36°36'N: Del Monte Beach, Monterey Bay; 18.5 m; A. G. Smith; August, 1937; 1 specimen.

36°36'N: Monterey; rare; in tide pools (Carlton and Kuris, 1975).

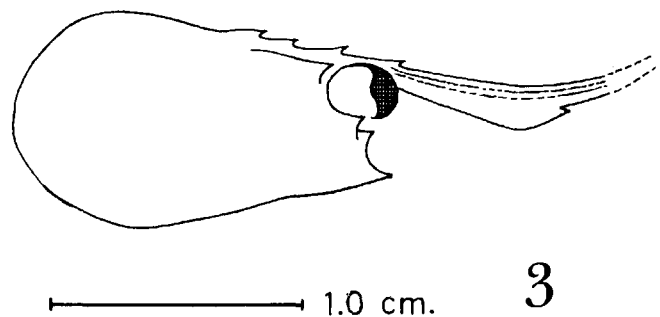
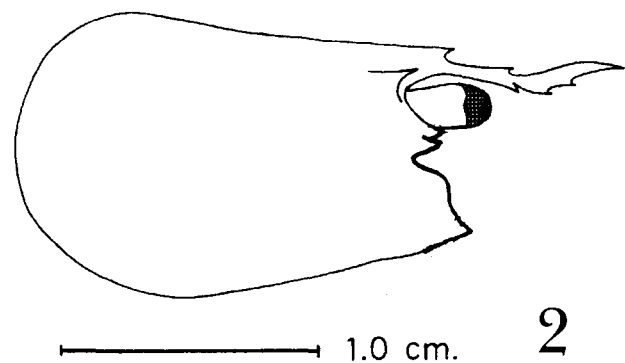
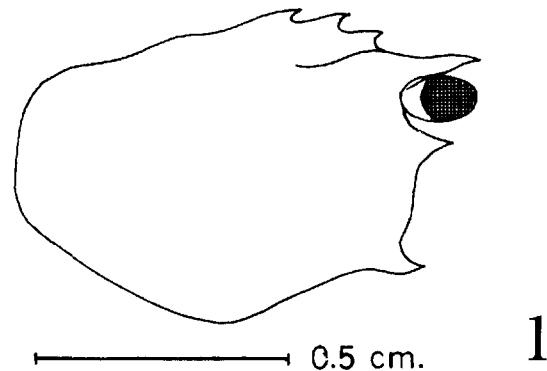
35°29'N: San Simeon; rocky intertidal zone (Word, 1976).

34°54'N: 3 miles east of South Point, Santa Rosa Island; 31.4-36.9 m, sand and kelp bottom; VELERO III station 1410-41; September 15, 1941; 4 specimens.

33°53'N: 2½ miles east of South Point, Santa Rosa Island; 27.6-38.8 m, among red algae and shell; VELERO III station 1280-41; April 10, 1941; 2 specimens.

33°53'N: 2½ miles east of South Point, Santa Rosa Island; 31.4-33.2 m, among gravel and red algae; VELERO III station 1282-41; April 10, 1941; 1 specimen.

33°49'N: King Harbor, Redondo Beach, site 41-1; 3 m, rocky bottom with algae; King



Figs. 1-3: 1, Carapace of: *Lebbeus lagunae*;  
2, *Lebbeus washingtonianus*; 3, *Lebbeus polaris*.

- Harbor Project, Univ. So. Calif.; September 3, 1975; 1 specimen.
- 33°41'N: 2.35 miles ESE of Los Angeles light; 22.2-24 m, mud and sand bottom; VELERO IV station 2090-51; December 8, 1951; 1 specimen.
- 33°35'N: Laguna Beach; 22.2-27.7 m; type locality (Schmitt, 1921).
- 33°29'N: East of Santa Barbara Island; shoal to 73.8 m, sandy bottom; VELERO III station 895-38; August 12, 1938; 3 specimens.
- 32°41'N: North Tanner Bank; 26 m; Arthur Wolfson, station A-1; September 3, 1976; 2 specimens.
- 32°33'N: between Coronado Islands and Point Loma; 55.4 m; Carl Hubbs, station H49-166; November 26, 1949; 1 specimen.
- 32°25'N: South Cortez Bank; 20 m; Arthur Wolfson, quadrat 2, number 3; September 14, 1976; 1 specimen.

Holthuis (1947) divided the species of *Lebbeus* into three groups according to the placement of epipods on the pereopods. *Lebbeus lagunae* belongs to the group with epipods on the first, second, and third pereopods; as does *L. washingtonianus*. *Lebbeus polaris*, however, has epipods only on the first and second pereopods.

*Lebbeus lagunae* usually inhabits low intertidal to subtidal areas, where it occurs among algae. Schmitt (1921) noted that the animal had a "kelp color," with a "light body, darker legs, and red and black on appendages," suggesting that his specimen was collected among algae. The animal taken off Hopkins Marine Station was collected among red algae at night, and was marked with white, rose-red, dark rose-red, tan, and brick red, providing excellent camouflage among the algae. Like the specimen photographed in Schmitt's Plate 12, Figure 11 (*op. cit.*), the living animal from Pacific Grove held the abdomen elevated off the substrate.

Ovigerous females of this species were taken at VELERO III stations 895-38, 1280-41, and 1410-41, during the months of April, August, and September, indicating that the species reproduces from late spring through summer. Females were estimated to carry from 800 to 900 eggs each. As shown in Fig. 4, the females tend to have the dorsal midline of the carapace curved rather than nearly straight, as in the males.

Six of the specimens examined had feathery setae on the dorsal surface of the carapace, the anterior surface of the third maxillipeds, and the anterior surfaces of the walking legs. The location and the finely branched flexible structure of these setae suggests a sensory function.

*Lebbeus washingtonianus* (Rathbun 1902)

Fig. 5

*Spirontocaris washingtoniana*, Rathbun, 1902, pp. 895-896.

*Spirontocaris washingtoniana*, Rathbun, 1904, p. 76, fig. 30.

*Spirontocaris washingtoniana*, Schmitt, 1921, p. 55, fig. 33.

*Lebbeus washingtonianus*, Holthuis, 1947, pp. 10, 38.

*California Records.* 33°50'N: Santa Rosa-Santa Cruz Island slope (14.7 miles, 002.5°T to Bowen Point, Santa Cruz Island); 1217 m; VELERO IV station 24804; April 22, 1976; 1 specimen.

33°50'N: West slope of Santa Cruz Basin (13.2 miles, 342°T to Bowen Point, Santa Cruz Island); 1808 m; VELERO IV station 24803; April 22, 1976. 1 specimen.

33°50'N: 15 miles south of Santa Rosa Island (13.7 miles, 001°T to South Point, Santa Rosa Island); 1542 m; VELERO IV station 24810; April 23, 1976; 1 specimen.

33°34'N: Southwest of Santa Catalina Island (10.8 miles, 315°T to Santa Barbara Island light); 1206 m; muddy bottom; VELERO IV station 24585; April 6, 1976; 1 specimen.

32°46'N: East of San Clemente Island; 847-864 m; *Albatross* station 4401 (Schmitt, 1921).

*Lebbeus washingtonianus* is strictly an inhabitant of the continental slope. Taken with *L. washingtonianus* in the trawls made by the VELERO IV were the tanner crab *Chionoecetes tanneri*, the anomurans *Munidopsis quadrata*, *Lopholithodes foraminatus*, and *Parapagurus pilosimanus benedicti*, and the shrimp *Pandalus platyceros*. *Lebbeus washingtonianus* and these other decapods probably inhabit soft substrates.

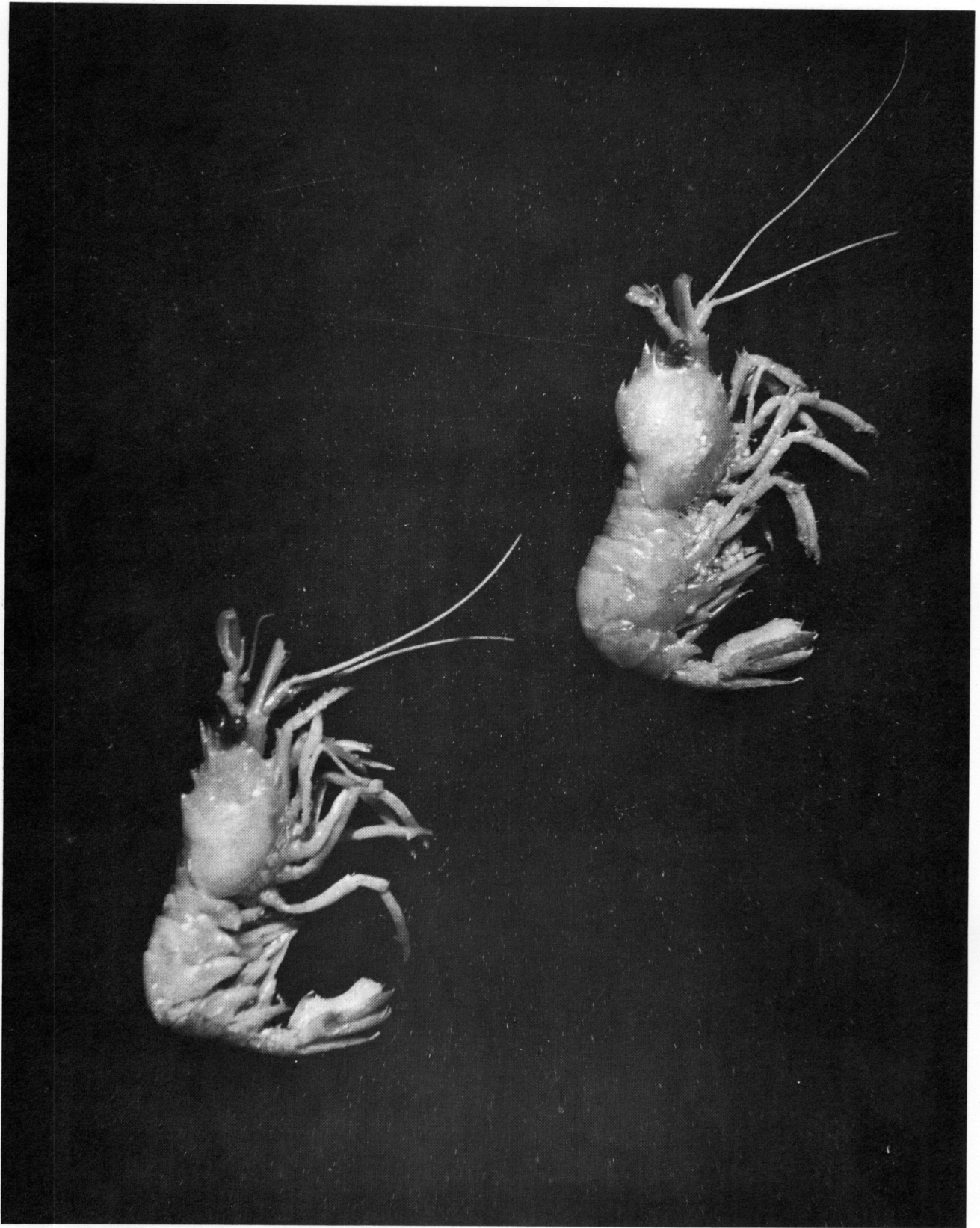


Fig. 4: *Lebbeus lagumae*. Top male, lower female. Total lengths 27.4 and 27.5 mm, respectively. VELERO III station 895-38.

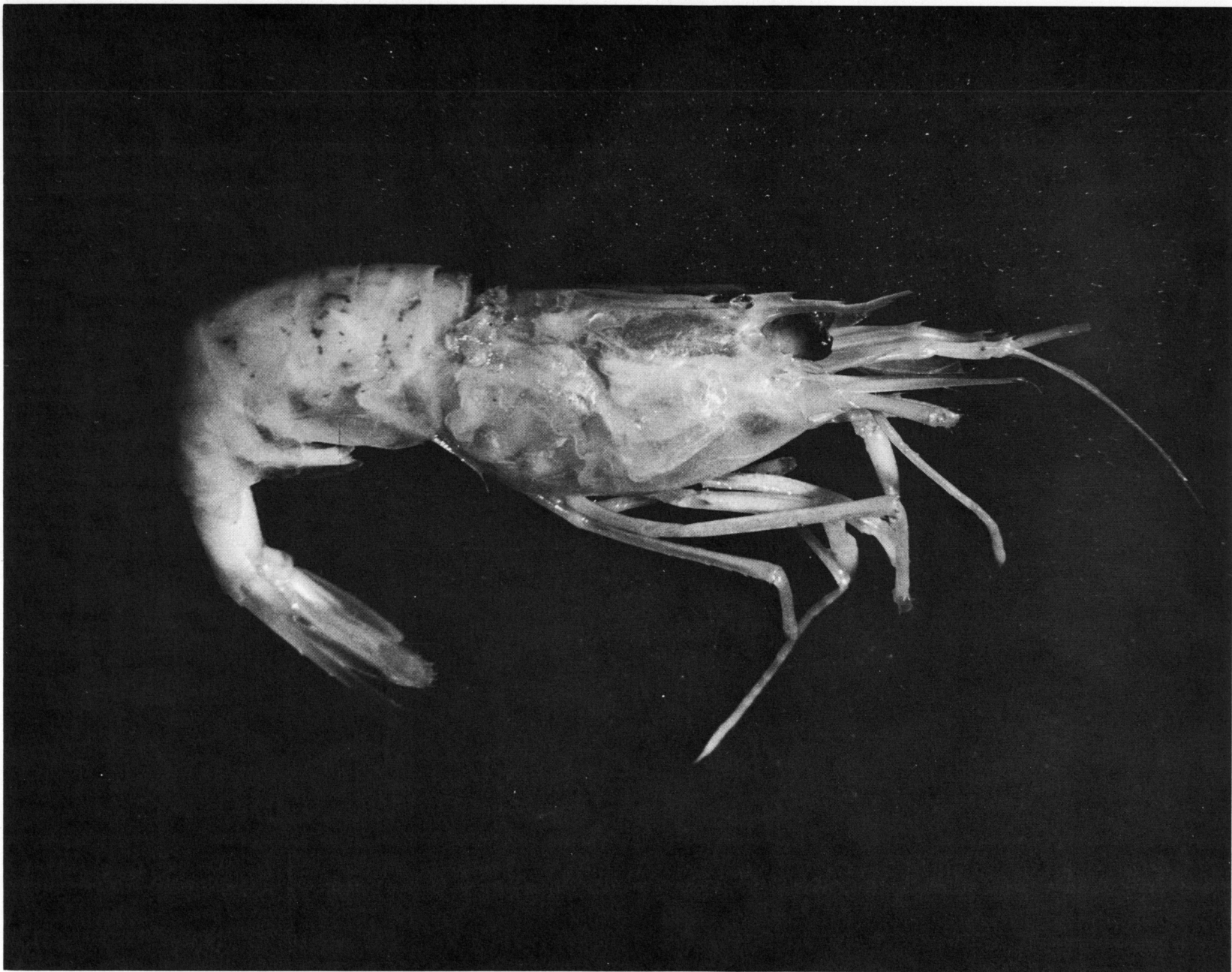


Fig. 5: *Lebbeus washingtonianus*. Female, total length 37.9 mm. VELERO IV station 24803.

*Lebbeus polaris* (Sabine 1821)

## Fig. 6

*Alpheus polaris*, Sabine, 1821, p. 238, pl. II, figs. 5, 8.

*Spirontocaris unalaskensis*, Rathbun, 1902, p. 895.

*Spirontocaris unalaskensis*, Rathbun, 1904, pp. 74-75, fig. 28.

*Spirontocaris polaris*, Rathbun, 1904, pp. 73-74.

*Lebbeus polaris*, Holthuis, 1947, p. 39.

*Hetairus polaris*, Kobayakova, 1955, p. 204, pl. 36, figs. 4a, 4b.

California Record. 36°45.3'N, 122°04.7'W to 36°45.7'N, 122°04.8'W; Monterey submarine canyon, 954-1044m; U.S.N.S. DE STEIGUER Cruise; November 19, 1975; 1 specimen.

The single broken female of *L. polaris* was taken in a seven-foot McDuck beam trawl. Collected in the same trawl were the tanner crab, *Chionoecetes tanneri*, and the hermit crab, *Pagurus tanneri*. The left branchial chamber of the shrimp contained mud, suggesting that it was taken on a muddy bottom.

Specimens of *L. polaris* have been taken in many locations in northern waters. Rathbun (1904) gave the range from northern Europe to the Atlantic coast of the United States south to Cape Cod, from the Bering Sea to the Okhotsk Sea and the Aleutian Islands eastward to Kadiak, and from 10 to 218 fathoms (18.5 to 402.5 m). The specimen from the Monterey submarine canyon is the southernmost individual of the species reported from the west coast of North America.

Holthuis (1947) synonymized *Spirontocaris unalaskensis* Rathbun 1902 conditionally with *L. polaris* because the only difference between the two species was the length of the rostrum relative to the carapace, a feature subject to considerable variation. The specimen from the Monterey submarine canyon resembles the animal illustrated by Rathbun (*op. cit.*, as *S. unalaskensis*) in possessing a rostrum longer than the carapace, with four spines on the dorsal surface and three on the ventral surface. Unlike the specimens from Alaska, the individual from California possesses a carapace with a carina along the entire dorsal midline and has the two spines on the carapace closer to each other than

to the two on the rostrum instead of having only the anterior half of the carapace carinated and the dorsal spines equally spaced.

Kobayakova (1955) apparently was unaware that Holthuis (*op. cit.*) put *Hetairus* into synonymy with *Lebbeus*. The female from the Monterey submarine canyon agrees with the ones she illustrated and described from Russian waters except that the animal from California does not have quite as lamelliform a rostrum as the ones from the U.S.S.R.

## DISCUSSION

The species of *Lebbeus* in California differ in their ranges and depths. *Lebbeus lagunae*, a shallow water species, ranges from Monterey Bay south at least to the U.S.-Mexican border. *Lebbeus washingtonianus*, principally a bathyal species, ranges from Sea Lion Rock, Washington, to east of San Clemente Island, California (Schmitt, 1921). *Lebbeus polaris*, a circum-polar species, frequents deeper water as it reaches the southern end of its range in California.

Another hippolytid, *Spirontocaris affinis* (Owen 1839) was placed with the species now assigned to *Lebbeus* in the key by Schmitt (1921, as *Spirontocaris*) because it appeared to have only one supraorbital spine. Holthuis (1947) noted that the original description (Owen, 1839, plate 27, fig. 4) of the type specimen showed two tiny spines below the large one, suggesting that the animal belonged to the genus *Spirontocaris sensu strictu*, not *Lebbeus*. Only the discovery of additional specimens of this species, known only from animals collected off Monterey (Owen, 1839) will resolve the question of the generic affinity of this shrimp.

That no specimens of *L. washingtonianus* are known between Washington and Santa Rosa Island, California, and no individuals of *L. polaris* have been taken between Alaska and Monterey Bay, California is not surprising due to the great depths at which they have been collected. Little exploration and collecting in deep water have been done off Oregon, northern California, and much of central California. One can expect that additional work in these areas may provide more information on these little-known shrimp.