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Pagurus nigrofascia, a new species of hermit crab (Decapoda: Anomura: Paguridae) from Japan

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Abstract. **— A new intertidal species of hermit crab, *Pagurus nigrofascia*, is described and illustrated on the basis of materials from three separate localities in Japan, Hakodate Bay (southern Hokkaido), Amakusa Matsushima (Kyushu), and Wakayama at the mouth of Osaka Bay (Kinki district of Honshu). The new species is compared with *P. samuelis* (Stimpson, 1857), *P. hirsutiusculus* (Dana, 1851) and *P. venturensis* Coffin, 1957, from the west coast of North America, and *P. filholi* De Man, 1887, from Asian waters. It is suggested that Stimpson's (1858) *Eupagurus hirsutiusculus* from Hakodate Bay might acutually be this new species. The new species is one of the most common intertidal hermit crabs in Hakodate Bay.**

Introduction

Several hermit crab species of the genus *Pagurus* are common in intertidal to subtidal depths in northern Japan, e.g., *P. dubius* Ortmann, 1892, *P. filholi* De Man, 1887 (previously known as *P. geminus* McLaughlin, 1976; see Sandberg & McLaughlin, 1993), *P. lanuginosus* De Haan, 1849, and *P. middendorffii* Brandt, 1851. These hermit crabs have been the subject of recent ecological or behavioral studies (e.g., Imazu & Asakura, 1994; Wada, *et al.*, 1995; Ohmori, *et al.*, 1995). During decapod faunal surveys in 1985 to 1995 of northern Japan, including Hokkaido and Tohoku district, I collected specimens believed to represent an undescribed, but common species of *Pagurus* from the intertidal rocky shores of Moheji and Kattoshi, on the coast of Hakodate Bay, southern Hokkaido. The general coloration of the specimens was most similar to that of *P. lanuginosus*, but morphologically the specimens were closest to the American species *P. samuelis* (Stimpson, 1857), *P. hirsutiusculus* (Dana, 1851) and *P. venturensis* Coffin, 1957, and the western Pacific species *P. filholi*. Given that the material from only a single locality existed, the description of a new species was deferred in the hope that additional specimens might be obtained from other localities. Various collecting efforts since 1985 in northern Japan failed to produce any material from other localities, but through the kind courtesy of Dr. Y. Imahara (Wakayama Prefectural Museum) and Prof. K. Baba (Kumamoto University), I was able to obtain additional material of this species from Wakayama, Kinki district of Honshu, and Amakusa Matsushima, Kyushu, far distant from Hakodate. The new species, described herein as *Pagurus nigrofascia*, is one of the most common hermit crabs found intertidally in Hakodate Bay. However, in Wakayama and Amakusa, it is rather rare and its occurrence is restricted to the winter to early spring seasons in Wakayama and Amakusa (Dr. Imahara, Prof. Baba, personal communication). The specimens reported by Stimpson (1858) from Hakodate Bay as *Eupagurus hirsutiusculus* might actually represent this species.

The holotype is deposited in the Natural History Museum and Institute, Chiba (CBM), and paratypes are deposited in CBM, Laboratory of Marine Zoology, Faculty of Fisheries, Hokkaido University (HUMZ) and the National Museum of

Fig. 1. *Pagurus nigrofascia* new species. Paratype, male (SL 7.3 mm; CBM-ZC 2307), entire animal in dorsal view. (Photo by K. Baba)

Natural History, Smithsonian Institution, Washington, D.C. (USNM). The abbreviation SL indicates shield length measured from the tip of the rostrum to the midpoint of the posterior margin of the shield. Terminology mainly follows McLaughlin (1974), but Morgan & Forest (1991) is referred to for the carapace sulci.

Pagurus nigrofascia new species

(Figs. 1–6)

? *Eupagurus hirsutiusculus*: Stimpson, 1858: 250 (in part); 1907: 233 (in part; no new locality); Terao, 1913: 369 (in part; no new locality). See "Remarks."

? *Pagurus hirsutiusculus*: Miyake, 1957: 88 (no new locality); 1978: 80 (key, in part; no new locality); 1982: 226 (key, in part; no new locality). See "Remarks."

Type-material. — Holotype: CBM-ZC 2267, male (SL 6.0 mm), Moheji, Hakodate Bay (41°45'N, 141°40'E), rocky intertidal, hand collecting, 14 April 1991, coll. T. Komai.

Paratypes: CBM-ZC 2268, 1 male (SL 6.7 mm), Moheji, Hakodate Bay, rocky intertidal, hand collecting, 17 April 1990, coll. T. Komai; CBM-ZC 2269, 1 male (SL 3.4 mm), 2 females (SL 4.4, 4.8 mm),

Moheji, rocky intertidal, hand collecting, May 1990; CBM-ZC 2270, 10 males (SL 3.3–6.0 mm), Kattoshi, Hakodate Bay, rocky intertidal, hand collecting, 30 Nov 1994, coll. S. Goshima; CBM-ZC 2271, 4 females (SL 2.9–4.8 mm), 2 ovig. females (SL 4.3, 4.8 mm), data as for CBM-ZC 2270; CBM-ZC 2274, 11 males (SL 5.1–6.8 mm), Amura, Amakusa Matsushima, intertidal, hand collecting, 28 Jan 1989, coll. T. Sakamoto & K. Kusumoto; CBM-ZC 2307, 1 male (SL 7.3 mm), data as for CBM-ZC 2274; HUMZ-C 1565, 1 male (SL 4.8 mm), Wakayama (34°15'N, 135°07'E), rocky intertidal, hand collecting, 5 May 1992, coll. Y. Imahara; USNM 274391, 1 male (SL 5.5 mm), 1 female (SL 5.4 mm), 1 ovig. female (SL 5.4 mm), collected with holotype.

Description. — Shield (Fig. 2A) longer than broad (ratio of shield length/width 1.16–1.27); anterolateral margins sloping; anterior margin between rostrum and lateral projections nearly straight; lateral margins very slightly convex; posterior margin roundly truncate; dorsal surface with numerous tufts of long stiff setae laterally, median area nearly naked except for median line with few tufts of setae. Rostrum strongly produced, far overreaching lateral projections, triangular, terminating in acute spine; partially obscured by tuft of moderately long setae. Lateral projections obsolete, with small marginal spine. Posterior carapace (Fig. 2B) poorly calcified except for somewhat calcified cardiac region, with numerous tufts of long setae; cardiac sulci slightly divergent posteriorly; cardiobranchial sulci short.

Ocular peduncles (Fig. 2A) moderately short and stout (ratio of ocular peduncle length/shield length 0.54–0.59) somewhat inflated basally, with cornea slightly dilated; dorsal face with irregular longitudinal row of tufts of moderately short setae. Ocular acicles moderately slender, subovate, with strong submarginal spine.

Antennular peduncles (Figs. 2A, 5A) moderately long, exceeding ocular peduncles by half length of ultimate segment. Ultimate segment slightly longer than intermediate segment, with scattered long setae on dorsal surface and row of short setae on ventral surface. Statocyst bluntly pointed, separated from basal segment by narrow incision; lateral margin unarmed.

Antennal peduncles (Fig. 2A) moderately long, reaching or slightly overreaching ocular peduncles by fifth segment. Fifth and fourth segments unarmed, but with scattered tufts of short setae. Third segment with ventromesial distal angle bearing acute spine. Second segment with dorsolateral distal angle strongly produced, terminating in bifid spine; mesial margin with 1 subdistal spine, dorsomesial distal angle with small spine. First segment with spine on lateral face distally; ventromesial margin with row of spinules distally. Antennal acicle moderately long, not reaching level of midlength of fifth peduncular segment of antennal peduncle, somewhat arcuate, terminating in acute spine; dorsal surface with tufts of stiff setae; mesial margin unarmed. Antennal flagellum long, overreaching tip of right cheliped, each article usually with several minute bristles and with 1 or 2 additional short setae.

Mandible (Fig. 2C) without distinguishing characters. Maxillule (Fig. 2D) with proximal endite subquadrate; endopod with 1 seta on slightly produced inner lobe, outer lobe broadly subtriangular, not recurved. Maxilla (Fig. 2E) with endopod inflated basally, reaching anterior margin of scaphognathite. First maxilliped (Fig. 2F) with endopod approximately two-thirds length of exopod; exopod strongly expanded proximally. Second maxilliped (Fig. 2G) with basis-ischium fusion incomplete. Third maxilliped (Fig. 2H) with ischium (Fig. 2I) bearing well developed crista dentata and 1 accessory tooth; merus without

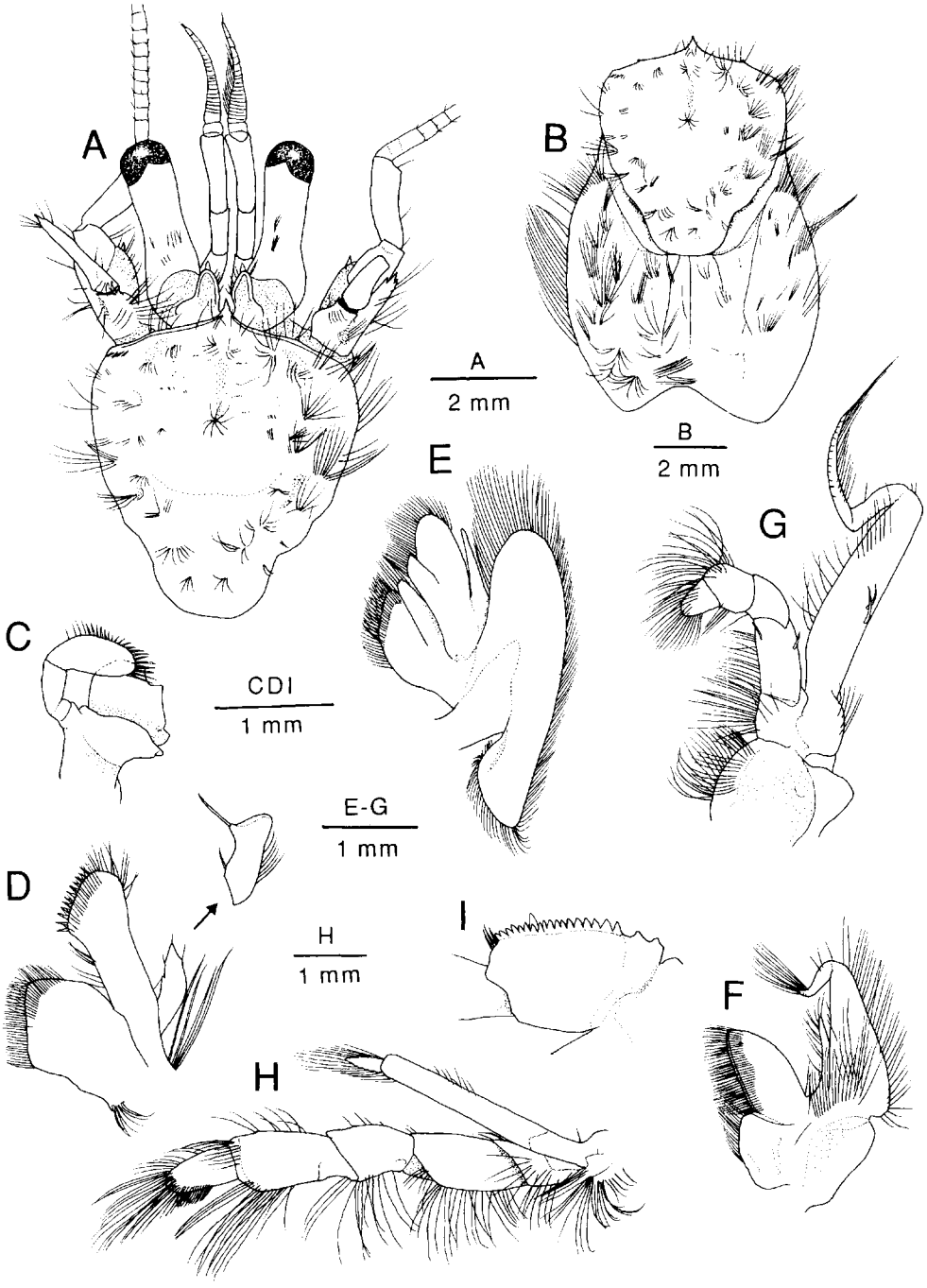

Fig. 2. *Pagurus nigrofascia* new species. Holotype male (SL 6.0 mm; CBM-ZC 2267), all apppendages from left side. A, shield and cephalic appendages, dorsal, setae partially removed from left side; B, carapace, dorsal, setae partially removed from left side; C, mandible, internal; D, maxillule, external; inset, endopod, lateral; E, maxilla, external; F, first maxilliped, external; G, second maxilliped, external; H, third maxilliped, lateral; I, ischium of third maxilliped, dorsal, setae omitted.

dorsodistal spine, ventral spine present or absent; carpus with dorsodistal margin somewhat produced, but unarmed. Sternite of third maxilliped with anterior margin very slightly concave, partially obscured with tufts of setae, anterolateral corners each with small spine.

Right cheliped (Fig. 3A–D) moderately long and stout, with slight degree of counter-clockwise torsion. Chela 1.3–1.6 times as long as broad and 1.1–1.3 times as long as carpus. Dactyl moderately long, slightly longer than palm measured along mesial margin; cutting edge with row of strong calcareous teeth in proximal three-fifths, short row of corneous teeth distally, terminating in small corneous claw; dorsal surface with submedian row of moderately small spines in proximal two-thirds and typically with tufts of long stiff setae, dorsomesial margin with row of moderately strong spines and tufts of stiff setae; mesial and ventral surfaces unarmed, but with tufts of stiff setae. Cutting edge of fixed finger with low calcareous tooth in proximal two-thirds and small corneous teeth interspersed between small calcareous teeth in distal third, terminating in small corneous claw. Palm moderately inflated dorsoventrally; dorsal surface slightly convex, with irregular rows of moderately strong or small spines; pilosity of palm variable from nearly naked to densely setose; dorsomesial margin with irregularly double row of strong spines and tufts of long stiff setae, dorsolateral margin arched in dorsal view, well delimited with row of strong spines decreasing in size distally and proximally; lateral and mesial surfaces with few scattered tubercles and tufts of long to moderately short stiff setae; ventral face with scattered tubercles and with tufts of long stiff setae. Carpus moderately long, almost as long as merus measured along dorsal margin, widened distally, moderately inflated ventrally; dorsomesial margin with row of strong spines and usually tufts of long stiff setae, dorsomesial distal angle slightly produced; dorsal surface with scattered small to moderately strong spines and typically with tufts of long stiff setae; distal margin with row of acute teeth; dorsolateral margin not particularly delimited; mesial surface with scattered tufts of moderately short to long setae, ventrodistal margin with row of moderately strong or small spines; ventrolateral face with scattered tufts of stiff setae; ventral surface with row of strong spines laterally and tufts of long stiff setae. Merus subtriangular in cross section; dorsal surface distally with transverse ridges bearing long stiff setae, distal margin with 3 strong spines; lateral face with scattered spinulose tubercles ventrally and vertical rows of stiff setae distally, ventrolateral margin with irregular row of strong spines; ventral surface with scattered spinulose tubercles and 1 enlarged tubercle proximally and with tufts of long stiff setae; mesial surface with vertical rows of stiff setae and scattered short setae, ventromesial margin not particularly delimited, but with moderately strong spines or spinulose tubercles arranged in single row, distal margin unarmed. Ischium with row of small spines on ventromesial margin, ventrolateral margin with few tubercles, ventrolateral distal angle not produced. Coxa with ventrolateral margin bearing small tubercles, ventrodistal margin with dense tufts of long stiff setae.

Left cheliped (Fig. 4A–D) moderately long, exceeding base of dactyl of right, moderately slender. Chela 2.1 times as long as broad, 1.4 times as long as carpus measured along median line. Dactyl moderately long, 1.6 times as long as palm measured along mesial margin; cutting edge with regular row of small corneous teeth, terminating in corneous claw; dorsal surface not markedly elevated, with scattered small spines, dorsomesial margin not delimited; dorsal, mesial and ventral surfaces with tufts of moderately long

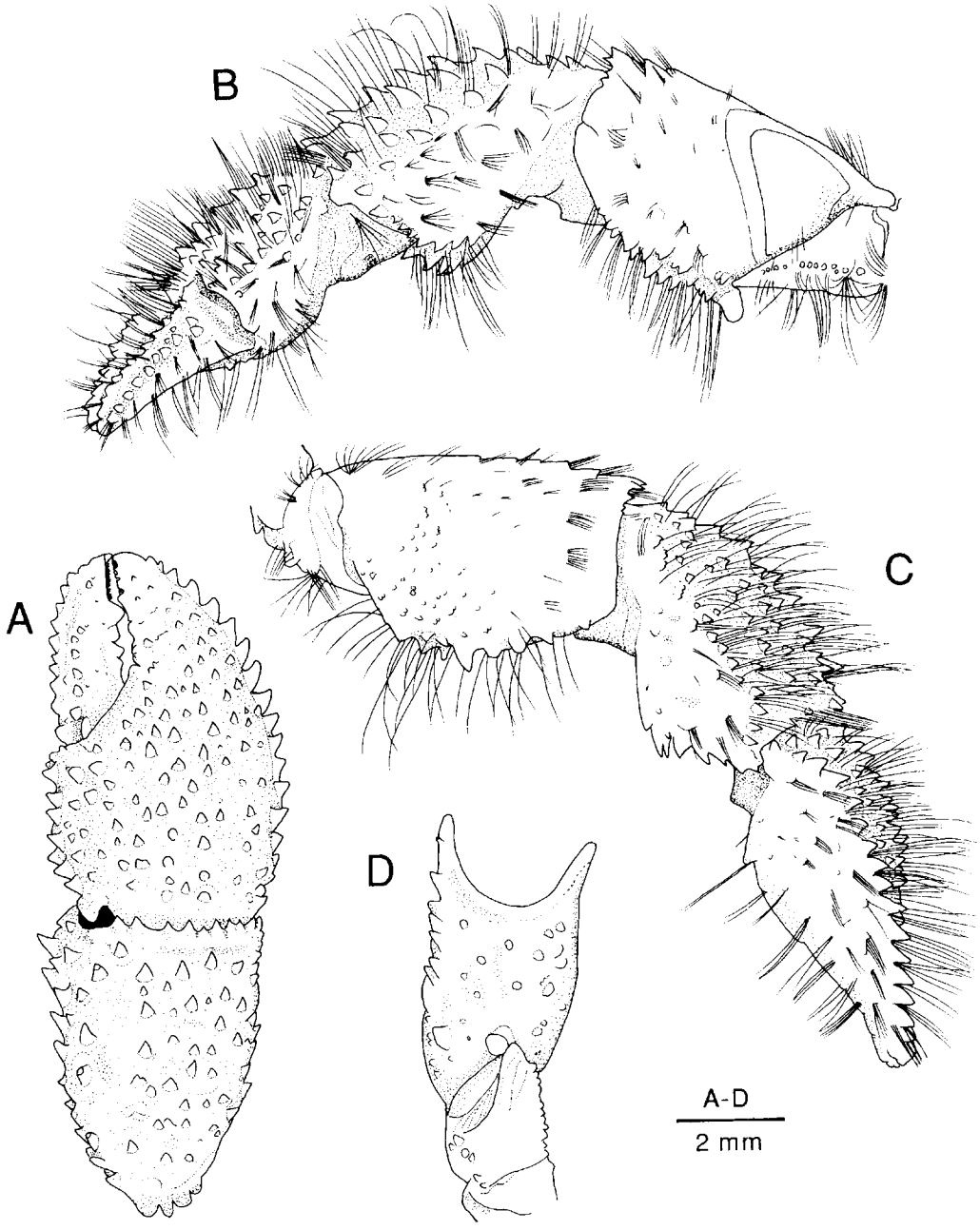

Fig. 3. *Pagurus nigrofascia* new species. Holotype male (SL 6.0 mm; CBM-ZC 2267). Right cheliped. A, chela and carpus, dorsal, setae omitted; B, chela, carpus, merus, and ischium, mesial, setae partially removed; C, same, lateral, setae partially removed; D, merus, ventral, setae omitted.

or long stiff setae. Palm armed on dorsal surface with scattered moderately strong spines or spinulose tubercles and typically with tufts of long stiff setae; slightly elevated in midline, dorsomesial margin not particularly delimited, dorsolateral margin with single row of rather small spines or spinulose tubercles; ventral surface spinulose, with scattered tufts of long stiff setae; cutting edge of fixed finger with row of calcareous teeth interspersed with few small corneous teeth. Carpus somewhat shorter than merus; dorsolateral and dorsomesial margins each with row of strong spines and tufts of long stiff setae, distal margin with 2 strong spines and few small spines, dorsal face unarmed, typically with tufts of long stiff setae, dorsomesial distal angle produced; mesial face with short vertical row of long stiff setae, distal margin almost smooth; ventral surface with scattered tufts of long setae; lateral surface with scattered small tubercles and tufts of stiff setae, ventrolateral margin with row of moderately strong spines and tufts of long stiff setae. Merus subtriangular in cross section, somewhat compressed laterally; dorsal surface with transverse ridges bearing long stiff setae, distal margin with 1 strong spine; lateral surface spinulose, with few tufts of short setae, ventrolateral margin with single row of strong spines increasing in size proximally, posteriormost one particularly enlarged, occasionally subconical as in holotype; mesial face nearly smooth, with few vertical row of stiff setae distally, ventromesial margin with irregular row of moderately strong spines; ventral surface with tufts of long stiff setae. Ischium with row of spinulose tubercles on ventromesial margin; ventral surface with spinulose tubercles laterally and tufts of long stiff setae; ventrolateral distal angle not produced, but with 2 small spinulose tubercles. Coxa similar to that of right.

Second pereopods (Fig. 5B) slightly unequal in length (right longer than left), similar in armature. Dactyls (Fig. 5B, C) 0.79–1.00 times as long as propodi, moderately broad, weakly curved in lateral view, nearly straight in dorsal view, terminating in strong, curved corneous claws; dorsal surfaces each with row of small spinulose tubercles and typically with tufts of long stiff setae; lateral and mesial faces each with shallow longitudinal sulcus; ventral margins each with 6–8 moderately strong corneous spines, increasing in size distally. Propodi each about 1.5 times as long as carpi; dorsal margin with row of strong spines, dorsal, mesial, and lateral surfaces typically with tufts of long stiff setae; ventral surfaces each with pair of corneous spines at distal margin, followed by 1–4 corneous spines arranged in single row. Carpi each with dorsal margin bearing row of strong spines increasing in size distally and 1 subterminal spine, and typically with tufts of long setae; lateral face with row of tufts of long setae dorsally; mesial face almost naked; ventral surface with few long setae, ventrodistal angle not produced, with 1 small tubercle in left. Meri each with dorsal margin bearing single row of low protuberances and tufts of dense long stiff setae; lateral surfaces with scattered short stiff setae, mesial surfaces almost naked; ventral margins each with row of strong spines decreasing in size proximally and tufts of long stiff setae. Ischia with dorsal and ventral margins almost smooth, but with tufts of moderately long or long stiff setae.

Third pereopods (Fig. 5D, F) unequal in length and armature of propodi. Dactyls (Fig. 5D, E) 0.88–0.97 times as long as propodi, moderately broad, weakly curved in lateral view, nearly straight in dorsal view, terminating in strong, curved corneous claws; dorsal surfaces each with row of small spinulose tubercles and tufts of long to short stiff setae; lateral and mesial faces each with shallow longitudinal sulcus, lateral face with row of subacute spines or spinulose

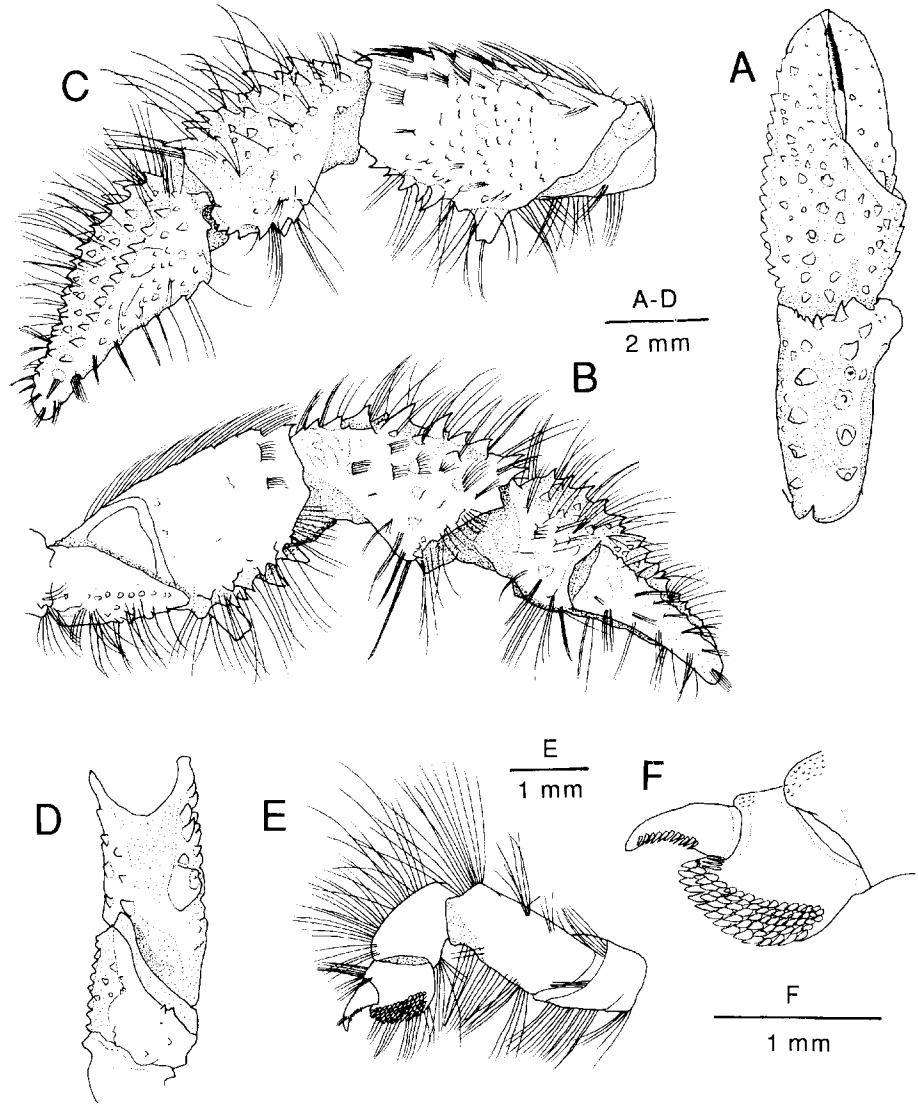

Fig. 4. *Pagurus nigrofascia* new species. Holotype male (SL 6.0 mm; CBM-ZC 2267), left cheliped (A-D) and left fourth pereopod (E, F). A, chela and carpus, dorsal, setae omitted; B, chela, carpus, merus and ischium, mesial, setae partially removed; C, same, lateral, setae partially removed; D, merus, ventral, setae omitted; E, entire fourth pereopod, lateral; F, dactyl and propodus, setae omitted.

tubercles ventrally, mesial face with scattered corneous spines; ventral margins each with 6–9 moderately strong corneous spines, increasing in size distally. Propodi each about 1.3 times as long as carpi; dorsal margin with row of strong spines and typically with tufts of long stiff setae; lateral surface of left pereopod with irregular rows of small or moderately strong, subacute spines ventrally, becoming prominent distally, right pereopod without ventral spines; mesial faces each

with scattered tufts of stiff setae; ventral surface slightly protuberant, with 2 terminal spines and 1–6 corneous spines arranged in single row, left propodus bearing 4 paired corneous spines arranged in single row. Carpi each armed with row of strong spines dorsally, increasing in size distally, 1 subterminal spine, and with tufts of long setae; lateral face with row of tufts of long setae dorsally; mesial face almost naked; ventral surface with few tufts of long setae, ventrodistal angle strongly produced, with 2 or 3 acute or subacute spines on left , while not produced on right. Meri each with dorsal margins with single row of low protuberances and tufts of dense long stiff setae; lateral surfaces with scattered short stiff setae, mesial surfaces almost naked; ventral margin with row of subacute spines on left, with row of low protuberances on right, both with tufts of long stiff setae. Ischia each with dorsal margins weakly spinulose, with long stiff setae; ventral margin with tufts of moderately long stiff setae. Coxae each with gonopore in females.

Anterior lobe of sternite of third pereopods (Figs. 5G, 6) subrectangular, varying in armature: unarmed in small specimens (< SL 4.8 mm; Fig. 6A), with 2–7 spinulose tubercles anteriorly in relatively large specimens (> SL 4.8 mm; Figs. 5G, 6C, D), or with low tubercles (Fig. 6B); anterior surface obscured by dense stiff setae.

Fourth pereopods (Fig. 4E, F) subchelate. Dactyl long, lacking preungual process; dorsal margin with few tufts of short stiff setae. Propodus with well developed rasp of several rows of corneous scales; ventral margin strongly convex. Dorsal margins of propodus, carpus, and merus with long, dense setae.

Fifth pereopods chelate; coxae in male each with gonopore slightly produced, partially encircled by short stiff setae. Sternal plate separated into two lobes by obscure median notch, ventral margin with dense long setae.

Abdomen (Fig. 1) strongly twisted, with 3 unpaired left pleopods in males and 4 unpaired in females; tergites of second and third somites with tufts of moderately long setae. Uropods strongly asymmetrical; exopod of left with row of moderately spaced stiff setae on dorsal margin. Telson (Fig. 5H) with posterior lobes divided by shallow median notch, lateral margins rounded, smooth, terminal margins slightly oblique, each with row of 9–15 minute spinules.

Coloration. — In fresh specimens (Fig. 1): Shield generally olive green, anterior region sometimes pale; posterior carapace with 3 pale stripes (1 median and 2 submedian subparallel to linea anomurica) on olive green background. Ocular peduncles olive green with scattered dark brown spots. Antennular peduncle with base color olive green, becoming orangish distally. Antennal peduncle olive green; flagella orange-brown.

Chelipeds and ambulatory pereopods with base color olive green. Chelipeds with scattered dark brown spots except for dorsal surfaces of chelae; spines on dorsal surfaces of palms appearing darker; tip of chela orangish. Ambulatory pereopods with dactyls becoming orangish in distal three-fourths (excluding terminal claw), proximal one-fourth dark gray brown, giving ring-like appearance; propodi, carpi, and meri with sparse scattered dark brown spots; propodi with dark gray patch near base on lateral surface.

In alcohol: changing to overall light brown. Spots on chelipeds and ambulatory pereopods and rings on dactyls of ambulatory pereopods remaining for long time.

Size. — Largest male, SL 7.3 mm; largest female, SL 5.4 mm. Size range of ovigerous females, SL 4.3–5.4 mm.

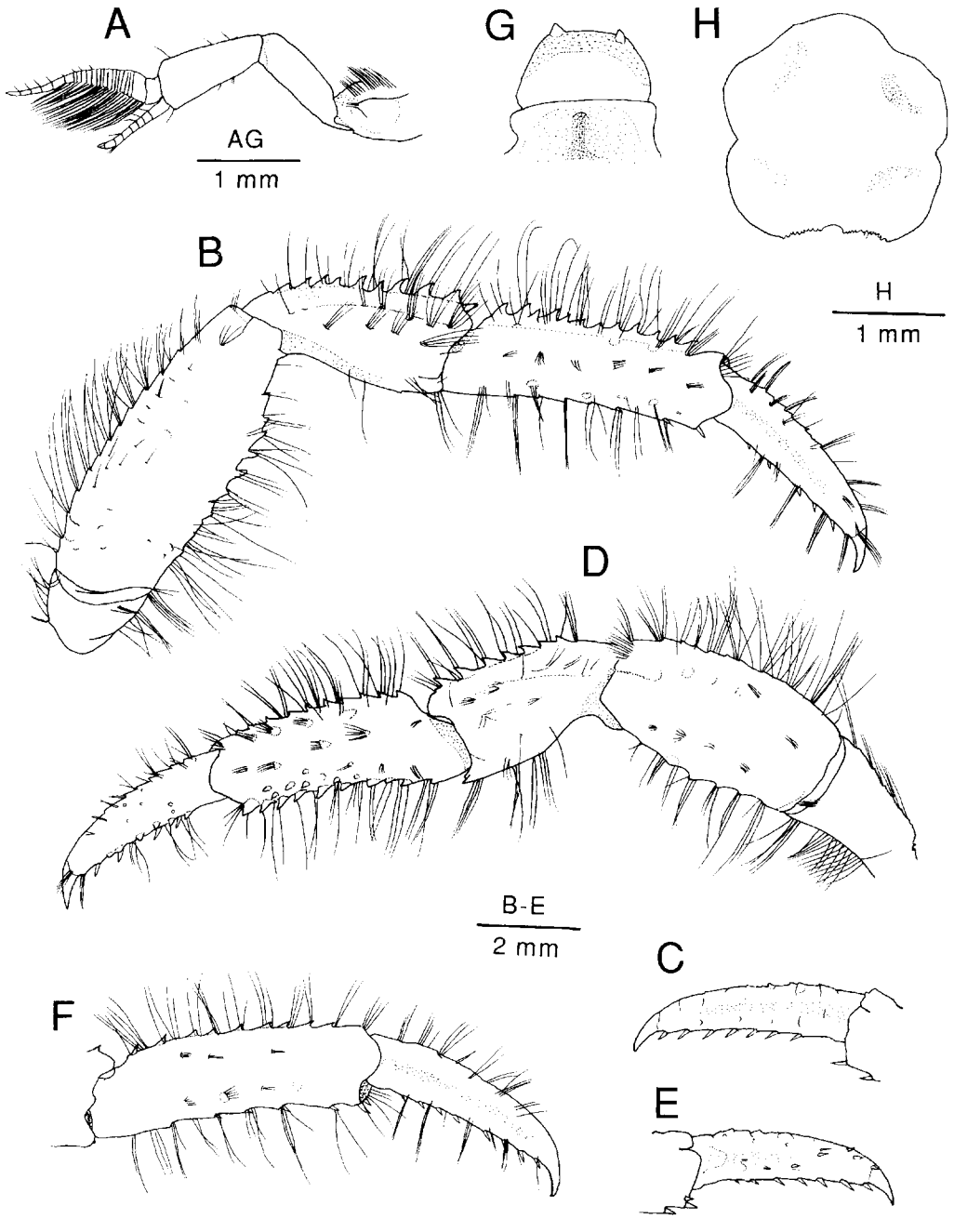

Fig. 5. *Pagurus nigrofascia* new species. Holotype male (SL 6.0 mm; CBM-ZC 2267). A, left antennule, lateral; B, right second pereopod, lateral; C, same, dactyl, mesial, setae omitted; D, left third pereopod, lateral; E, same, dactyl, mesial, setae omitted; F, dactyl and propodus of right third pereopod, lateral; G, anterior lobe of sternite of third pereopods, ventral, setae omitted; H, telson, dorsal, setae on lateral margin omitted.

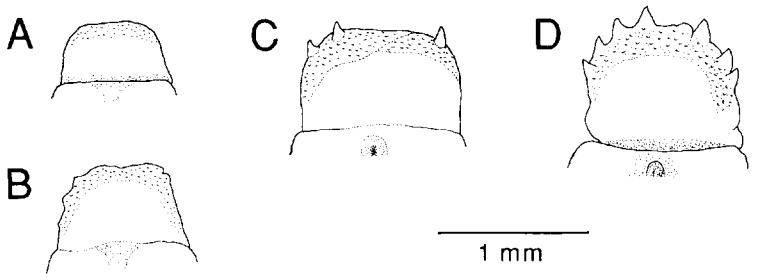

Fig. 6. *Pagurus nigrofascia* new species. Variation of anterior sternal lobe of third pereopods. Setae omitted. A, male paratype (SL 4.3 mm; CBM-ZC 2270); B, male paratype (SL 4.8 mm; CBM-ZC 2270), C, male paratype (SL 6.0 mm; CBM-ZC 2270); D, male paratype (SL 6.4 mm; CBM-ZC 2268).

Biology. — See Goshima *et al.* (1996).

The shells used by *Pagurus nigrofascia* are as follows. Hakodate Bay: *Monodonta labio confusa* Tapparone-Canefri; *Omphalius rusticus* (Gmelin); *Littorina brevicula* (Philippi); *Batillaria cumingii* (Crosse). Amakusa: *Lunella coronata coreensis* (Récluz).

Distribution. — Hakodate, southern Hokkaido; Wakayama, southern Honshu; Amakusa Matsushima, Kyushu; intertidal to subtidal.

Variations. — As shown in Figures 5 and 6, the new species displays considerable variation in armature of the anterior sternal lobe of the third pereopods, which seems to be correlated with growth. In relatively small specimens (< SL 4.8 mm), the sternal lobe is always unarmed, while in the larger specimens with SL 4.8–6.7 mm it bears two to seven low or spinulose tubercles. The size and number of the tubercles tend to increase with growth (Figs. 5G, 6C, D).

The setation of the chelipeds and ambulatory pereopods are apparently variable. Frequently, in *P. nigrofascia*, these appendages are setose, but, usually in the females specimens the setae on the dorsal surfaces are very short or absent. Density and length of the setae are variable only on the dorsal surfaces of these appendages, which are almost always exposed. This variation is presumably due to secondary loss of the setae rather than some biological factors as has been suggested for in members of "*Pagurus provenzanoi* group" (Lemaitre *et al.*, 1982).

Etymology. — The specific name is a noun in apposition from the combination of the Latin words, *niger* meaning black and *fascia* meaning ring, in reference to the characteristic darkly pigmented band on the ambulatory pereopods.

Remarks. — The new species appears closest to *P. samuelis*, known from the west coast of North America (McLaughlin, 1976). The characters shared by these two species are the strongly produced rostrum terminating into an acute spine; the propodus and dactyl of the left third pereopod bearing a row of calcareous tubercles or spines on the ventrolateral surface; and the anterior sternal lobe of the third pereopods armed with spines or tubercles on the anterior surface. Although *P. nigrofascia* is usually much more densely setose, this character is variable and is not always reliable. Several characters of the new species will distinguish it from *P. samuelis*, including the carpus of the left third pereopod with a strongly produced ventrodistal corner; much stronger armature of the dorsal surfaces of the carpi and propodi of the ambulatory pereopods; the presence of one, instead of two, prominent tubercle on the merus of the right cheliped; and the ter-

minal margins of the telson bearing minute spinules. In *P. samuelis*, the carpus of the left third pereopod is rounded ventrodistally. The two species are also readily distinguished by the color patterns of the chelipeds and ambulatory legs. In *P. nigrofascia*, the chelipeds are olive with scattered dark brown spots in general, with the orangish tips; the propodi are olive with dark brown spots; the dactyls are banded proximally with dark brown or gray, without stripes. In contrast, the chelipeds of *Pagurus samuelis* are darkly olive or olive and red orange in general with the bluish white tips; the propodi of the ambulatory legs are blueish white on the distal three-fourths, with dark red spines; the dactyls are bluish on the proximal three-fourths and reddish-white on the tips, with longitudinal red stripe on each of the dorsal, mesial and lateral surfaces (McLaughlin, 1974).

Among the western Pacific congeners, *P. filholi* most closely resembles the new species, but the relatively weak, rather obtuse rostrum, weaker armature of the right cheliped, rounded ventrodistal corner of the left third pereopod carpus, stronger armature on the terminal margins of the telson, and the coloration readily distinguish it from *P. nigrofascia*.

Pagurus nigrofascia also shows close resemblance to *P. hirsutiusculus* and *P. venturensis*, which until recently were treated as subspecies (see Crain & McLaughlin, 1993), but it differs from these two species in the carpus and merus of the third maxilliped lacking a dorsodistal spine, stronger armature on the palm of the right cheliped and the acutely produced ventrodistal coner of the carpus of the left third pereopods, as well as coloration. In *P. hirsutiusculus* and *P. venturensis*, there is no darkly pigmented band on each dactyl of the second and third pereopods.

The range of *P. hirsutiusculus* has been reported as south central California to Alaska and Japan (McLaughlin, 1974; Craine & McLaughlin, 1993), but the occurrence of this species in Japan has not been confirmed (cf. Komai *et al.*, 1992). The first report of *P. hirsutiusculus* from Japan was by Stimpson (1958) (as *Eupagurus hirsutiusculus*). His material was collected in Hakodate, where this new species is commonly found. Because of the close resemblance between *P. nigrofascia* and *P. hirsutiusculus*, it is quite possible that Stimpson (1858) confounded the Japanese species with the eastern Pacific taxon, and therefore his record is questionably included in the synonymy of this new species. This assumption, however, can not be confirmed because Stimpson's specimens were presumably lost in the Chicago fire of 1871 (cf. Rathbun, 1883). Stimpson (1907) report is simply a publication of an earlier manuscript edited by Rathbun. Terao (1913) and Miyake (1957) referred to Stimpson's report. Yokoya's (1933) *Eupagurus hirsutiusculus* from Tsugaru Strait at the sublittoral depth of 110 m is not referrable to either of *P. nigrofascia* or *P. hirsutiusculus*, because these two species are intertidal or subtidal inhabitants (cf. Craine & McLaughlin, 1993). Although morphological characters cited by Miyake (1978, 1982) in his key to Japanese species of *Pagurus* are correctly applicable to *P. hirsutiusculus*, he noted its occurrence in Japan as Hokkaido and Tsugaru Strait, apparently based on Stimpson (1858, 1907) and Yokoya (1933) reports. In their check list of the decapod Crustacea of Hokkaido, Komai *et al.* (1992) listed *P. hirsutiusculus* based only on Yokoya (1933) report, and consequently it does not pertain to either to Stimpson's *P. hirsutiusculus* or the new species.

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