Diagnostic Features: A medium-sized species. Body depth at first dorsal-fin origin 24 to 30% (mean 26%) of standard length; head length 26 to 29% (mean 28%) of standard length. Snout pointed; occipital profile strongly concave. Posterior margin of maxilla extending well beyond level of posterior margin of adipose eyelid; upper-jaw length 13 to 16% (mean 14%) of standard length, greater than caudal-peduncle depth [10 to 11% (mean 11%) of standard length]; depth of posterior margin of maxilla [4 to 5% (mean 5%) of standard length] greater than eye diameter [1 to 2% (mean 1%) of standard length]; lip on lower jaw well developed, dentary teeth restricted to dorsal surface; teeth villiform in broad bands on vomer, palatines and ectopterygoids. Posterior margin of preopercle serrated. First dorsal fin with VII spines, all spine bases of similar thickness; second dorsal fin with I spine and 14 to 16 (mode 15) soft rays; anal fin with II or III (mode III; first of 3 spines vestigial, confirmed by radiograph) spines and 11 or 12 (mode 11) soft rays, anal-fin base less than second dorsal-fin base; pectoral fin with 16 to 19 (mode 18) rays (all rays unbranched), its length 39 to 47% (mean 42%) of standard length, posterior tip reaching to level of midpoint of anal-fin base; pectoral filaments 7; first pectoral filament shortest, not reaching to level of posterior tip of pelvic fin; second pectoral filament not reaching to level of anal-fin origin; third pectoral filament reaching to near level of posterior end of anal-fin base or reaching between levels of origin and posterior end of anal-fin base; fourth pectoral filament slightly longer or slightly shorter than standard length; fifth to seventh pectoral filaments longer than total length; fifth pectoral filament longest, its length 323 to 339% (mean 331%) of standard length; caudal fin deeply forked, upper and lower caudal-fin lobes not filamentous, upper caudal-fin lobe 41 to 46% (mean 44%) and lower lobe 37 to 46% (mean 41%) of standard length. Pored lateral-line scales 90 to 103 (mode 94); lateral line simple, extending from upper end of gill opening to mid-distal margin of caudal-fin membrane; scale rows above lateral line 8 to 12 (mode 11), below 16 to 21 (mode 18). Gillrakers 10 or 11 (mode 10) on upper limb, 16 or 17 on lower limb, 26 to 28 (mode 26) total. Vertebrae 10 precaudal and 15 caudal; supraneural bones 2. Swimbladder present, well developed. **Colour:** (preserved specimens) Head and body greyish black dorsally, pale yellowish silver ventrally; membranes of first dorsal fin translucent, spines pale yellow; bases of second dorsal, pectoral, pelvic, anal and caudal fins pale yellow, posterior margins of these fins translucent; pectoral filaments uniformly whitish yellow.

Geographical Distribution: Currently known only from 3 rivers, Ensengi, Rajang and Sungai rivers, in western Sarawak, Kalimantan, Malaysia (Fig. 141).

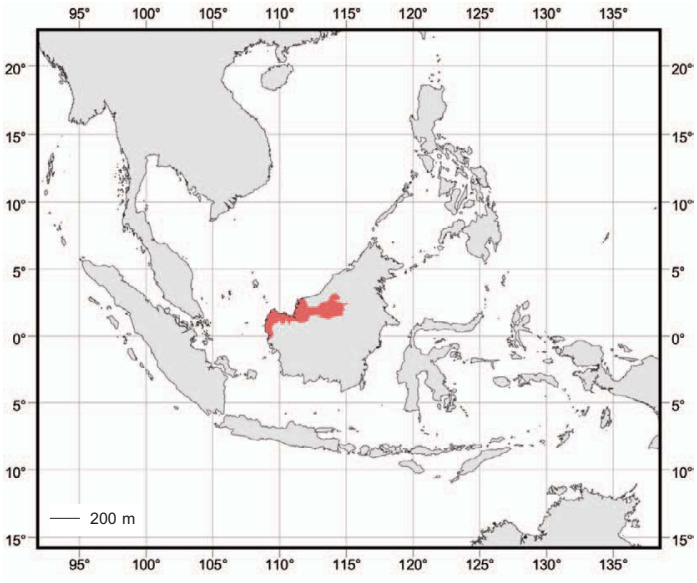

Fig. 141 ***Polynemus hornadayi***
Known distribution

Habitat and Biology: Occurs in muddy, fast flowing rivers, 12 m wide and 3 m deep (Feltes *in* Carpenter and Niem, 2001). Inhabits only fresh-water regions, having never been recorded from the estuarine areas behind the river mouths.

Size: Maximum standard length at least 20 cm (Motomura *et al*., 2002b).

Interest to Fisheries: Esteemed as a food fish in western Sarawak, Kalimantan, Malaysia.

Local Names: None known.

Literature: Motomura *et al*. (2002b).

Remarks: ***P. hornadayi*** and ***P. paradiseus,*** both have VII first dorsal-fin spines, whereas all other polynemid species have VIII spines. However, radiographs of ***P. hornadayi*** indicate that 4 of 26 specimens examined by the author have a grain of oval bone (diameter less than about 1 mm) buried under the subcutaneous tissue in front of the first dorsal-fin spine and associated with the first pterygiophore (see Motomura *et al*., 2002b: fig. 3B). While the anteriormost dorsal-fin spine of other polynemid species is also small, the spine is conventionally "spine-shaped" (not oval) with a dorsally exposed tip (see Motomura, Iwatsuki and Kimura, 2001b: fig. 4, Motomura *et al*., 2002b: fig. 3C). The oval bone associated with the first pterygiophore in some ***P. hornadayi*** is considered to represent the final stages of degeneration from an original spine precursor.

At a glance, ***P. hornadayi*** and ***P. paradiseus*** can be easily distinguished from each other by the shape of the occipital profile, that of ***P. hornadayi*** protruding strongly whereas that of ***P. paradiseus*** is nearly straight throughout life. In meristic characters, ***P. hornadayi*** differs from ***P. paradiseus*** in having lower counts of anal-fin soft rays [11 or 12 (mode 11) versus 12 (rarely 11 or 13) in the latter] and gillrakers [26 to 28 (mode 26) versus 30 to 34 (mode 32 or 33) in ***P. paradiseus***], and higher counts of pectoral-fin rays [16 to 19 (mode 18) versus 15 to 18 (mode 17) in ***P. paradiseus***], scales above and below the lateral line [8 to 12 (mode 11) and 16 to 21 (mode 18) versus 6 or 7 (mode 7) and 10 to 12 (mode 11), respectively in ***P. paradiseus***] and pored lateral-line scales [90 to 103 (mode 94) versus 66 to 71 (mode 70) in ***P. paradiseus***]. While ***P. hornadayi*** is similar to ***P. paradiseus*** in having 7 pectoral filaments, in the former the fifth pectoral filament is the longest [323 to 339% (mean 331%) of standard length] and the fourth filament extends well beyond the posterior central margin of the caudal fin, whereas in the latter the sixth filament is the longest [181 to 248% (mean 208%) of standard length] and the fourth filament fails to reach the posterior central margin of the caudal fin. The pectoral-fin ray of ***P. hornadayi*** is also relatively longer than that of ***P. paradiseus*** [posterior tip of pectoral fin reaching to midpoint of anal-fin base, 39 to 47% (mean 42%) of standard length versus not reaching, 30 to 35% (mean 33%) of standard length, respectively]. Furthermore, the posterior margin of the premaxilla of ***P. hornadayi*** is deeper than that of ***P. paradiseus*** [4 to 5% (mean 5%) of standard length

versus 3 to 4% (mean 4%) of standard length, respectively], ***P. hornadayi*** also tending to have a slightly longer head [26 to 29% (mean 28%) of standard length], postorbital [18 to 21% (mean 20%) of standard length], and pectoral-fin base [14 to 15% (mean 14%) of standard length], and greater pelvic-fin ray lengths [19 to 22% (mean 20%) of standard length] than ***P. paradiseus*** [24 to 27% (mean 27%), 17 to 19% (mean 18%), 13 to 14% (mean 13%) and 15 to 18% (mean 16%) of standard length, respectively], although the proportional length measurements overlapped between the 2 species (see Motomura *et al.*, 2002b: fig. 8). Internally, ***P. hornadayi*** differs from ***P. paradiseus*** in having a well-developed swimbladder (absent in the latter). Furthermore, the former frequently has a vestigial anal fin spine buried under subcutaneous tissue (62%, 16 of 26 specimens), such being absent in ***P. paradiseus*** (see Motomura *et al*., 2002b: table 3).

Polynemus kapuasensis Motomura and van Oijen, 2003

Fig. 142; Plate VId

Polynemus kapuasensis Motomura and van Oijen, 2003: 394, figs 1, 3a, 6 [type locality: Kapuas River Basin, fish market at Sintang, Kalimantan, Indonesia; holotype (CAS 47198, 151 mm standard length); 11 paratypes (CAS 217348, 3 specimens, 133 to 172 mm standard length; CAS 49454, 5 specimens, 33 to 76 mm standard length; CAS 217161, 3 specimens, 83 to 108 mm standard length)].

Synonyms: None.

FAO Names: En - Kapuas elegant paradise fish; **Fr** - Barbure paradis de Kapuas; **Sp** - Barbudo paraíso de Kapuas.

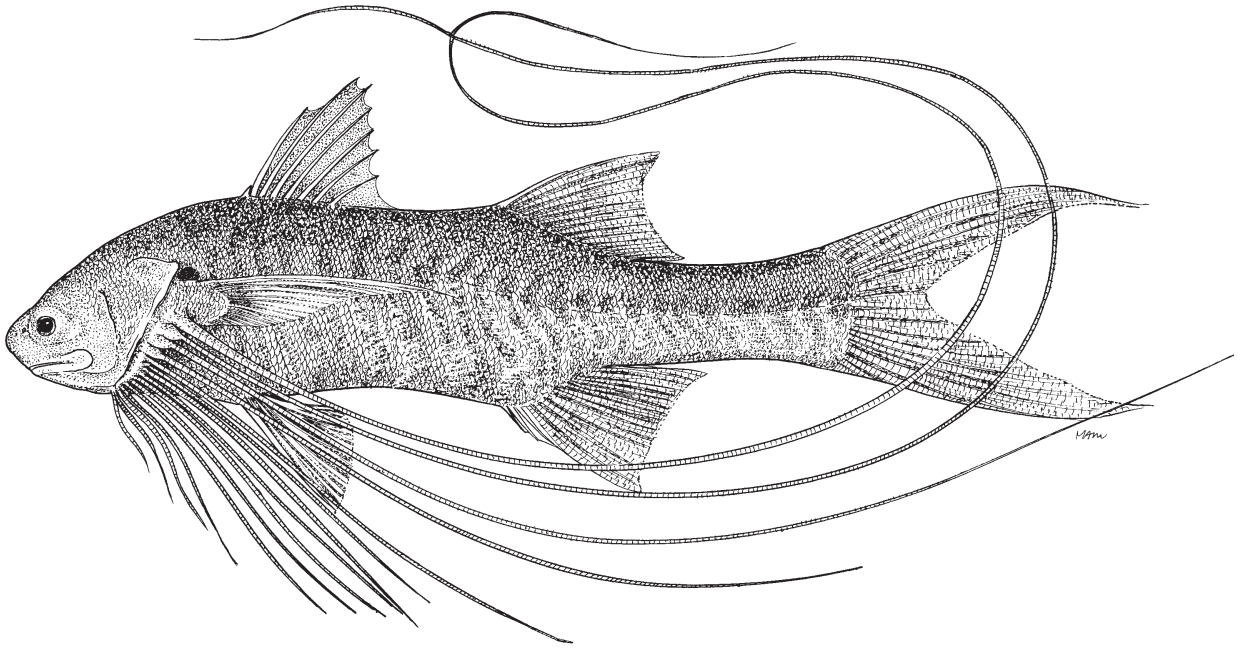

Fig. 142 ***Polynemus kapuasensis***

Diagnostic Features: A medium-sized species. Body depth at first dorsal-fin origin 23 to 25% (mean 24%) of standard length; head length 22 to 23% (mean 23%) of standard length in adults (more than about 130 mm standard length), 24 to 29% (mean 27%) of standard length in juveniles (less than about 110 mm standard length). Snout pointed; occipital profile nearly straight or slightly protruding. Posterior margin of maxilla extending well beyond level of posterior margin of adipose eyelid; upper-jaw length 10 to 11% (mean 10%) of standard length, approximately equal to caudal-peduncle depth [10 to 11% (mean 11%) of standard length]; depth of posterior margin of maxilla (2% of standard length) slightly less than eye diameter [3 to 4% (mean 3%) of standard length]; lip on lower jaw well developed, dentary teeth restricted to dorsal surface; teeth villiform in broad bands on vomer, palatines and ectopterygoids. Posterior margin of preopercle serrated. First dorsal fin with VIII spines, all spine bases of similar thickness; second dorsal fin with I spine and 15 or 16 (mode 15) soft rays; anal fin with III spines and 11 or 12 (mode 12) soft rays, anal-fin base less than second dorsal-fin base; pectoral fin with 15 to 17 (mode 15) rays (all rays unbranched), its length 29 to 33% (mean 31%) of standard length, posterior tip not extending beyond level of anal-fin origin in adults (more than about 70 mm standard length) or extending beyond level of anal-fin origin in juveniles (less than about 50 mm standard length); pectoral filaments usually 15 on each side of body, rarely 16 on each side or asymmetrically 15 and 16; first pectoral filament shortest, extending beyond level of pelvic-fin origin; second to seventh pectoral filaments not reaching to level of posterior tip of pelvic fin; eighth and ninth pectoral filaments extending beyond level of posterior tip of pelvic fin, but not reaching to level of anal-fin origin; tenth pectoral filament extending slightly beyond level of anal-fin origin; eleventh pectoral filament extending slightly beyond level of posterior end of anal-fin base; twelfth pectoral filament extending beyond level of posterior margin of central caudal fin, but not reaching to level of posterior

tips of caudal-fin lobes; thirteenth to fifteenth (or sixteenth if present) pectoral filaments longer than total length; thirteenth pectoral filament probably longest, 332 to 397% (mean 365%) of standard length; caudal fin deeply forked, upper and lower caudal-fin lobes not filamentous, upper caudal-fin lobe 41 to 51% (mean 46%) and lower lobe 35 to 50% (mean 40%) of standard length. Pored lateral-line scales 100 to 110 (mode 103); lateral line simple, extending from upper end of gill opening to mid-distal margin of caudal-fin membrane; scale rows above lateral line 9 to 11 (mode 10), below 17 to 20 (mode 18); caudal-peduncle scales 35 to 40 (mode 38). Gillrakers 9 to 11 (mode 11) on upper limb, 16 to 18 (mode 16 and 18) on lower limb, 25 to 29 (mode 28) total. Vertebrae 10 precaudal and 15 caudal; supraneural bones 2. Swimbladder present. **Colour:** Head and body bluish gray dorsally, silver ventrally; bases of first and second dorsal, anal and caudal fins reddish gray; first and second dorsal and caudal fins grayish white; posterior part of anal fin bluish white, remaining parts of anal and pelvic fins and pectoral filaments white; pectoral fin translucent.

Geographical Distribution: Currently known only from the Kapuas River system, western Kalimantan, Indonesia (Fig. 143).

Habitat and Biology: No data available.

Size: Maximum standard length at least 17 cm (Motomura and van Oijen, 2003).

Interest to Fisheries: Esteemed as an important food fish along the Kapuas River.

Local Names: None known.

Literature: Motomura and van Oijen (2003).

Remarks: ***Polynemus kapuasensis***, previously identified as ***P. multifilis*** (e.g. Myers, 1936; Roberts, 1989), was recently described as a new species on the basis of 12 specimens from the Kapuas River (Motomura and van Oijen, 2003).

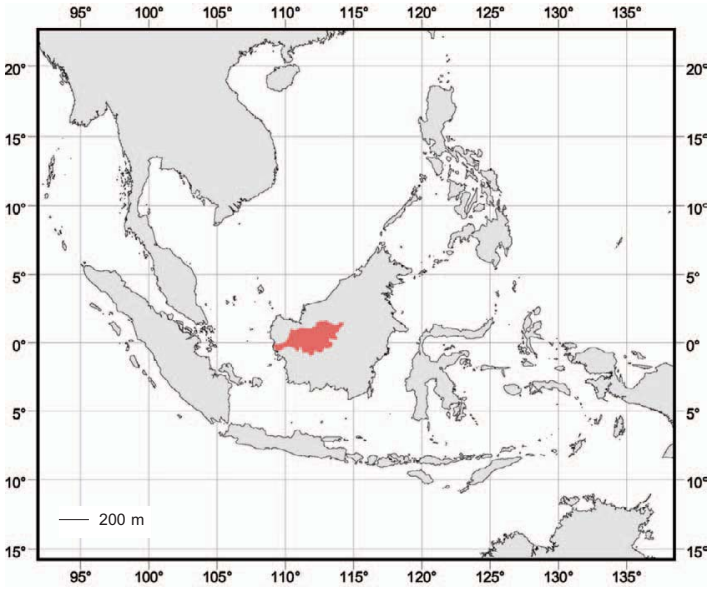

Fig. 143 ***Polynemus kapuasensis***
Known distribution

Polynemus kapuasensis and ***P. multifilis*** are easily distinguished from all other congeners by having higher counts of pectoral filaments (13 to 16 versus 7 in the latter). ***Polynemus kapuasensis*** differs from ***P. multifilis*** in having higher counts of pectoral filaments (usually 15 on each side of body, rarely asymmetrically 15 and 16, or 16 on each side versus usually 14 on each side, rarely 13 on each side, asymmetrically 13 and 14, or 14 and 15 in the latter), pored lateral-line scales [100 to 110 (mode 103) versus 83 to 99 (mode 86)], scale rows above and below lateral line [9 to 11 (mode 10) and 17 to 20 (mode 18), respectively versus 7 or 8 (mode 8) and 14 to 18 (mode 15), respectively] and caudal-peduncle scales [35 to 40 (mode 38) versus 28 to 37 (mode 32)] (see Motomura and van Oijen, 2003: tables 1-4). Furthermore, ***P. kapuasensis*** tends to have a slightly shorter head and anal-fin base lengths [22 to 23% (mean 23%) of standard length in adults more than about 130 mm standard length and 12 to 14% (mean 14%) of standard length, respectively] than ***P. multifilis*** [23 to 29% (mean 25%) of standard length and 15 to 17% (mean 15% of standard length, respectively], although the proportional measurements for the lengths overlapped between the two species, especially in young stages (see Motomura and van Oijen, 2003: fig. 6a-b). Moreover, the former has a short pectoral fin [29 to 33% (mean 31%) of standard length], its posterior tip not extending beyond the level of the anal-fin origin in adults (more than about 70 mm standard length), whereas the latter has a long pectoral fin [33 to 38% (mean 36%) of standard length], its posterior tip reaching or extending beyond the level of the anal-fin origin throughout life (see Motomura and van Oijen, 2003: fig. 6c).

Polynemus melanochir dulcis Motomura and Sabaj, 2002

Fig. 144; Plate VIe

Polynemus melanochir dulcis Motomura and Sabaj, 2002: 182, fig. 1 [type locality: Lake Tonle Sap, Cambodia; holotype (ANSP 178011, 135 mm standard length); 2 paratypes (AMS I. 40968-001, 126 mm standard length; BSKU 14850, 128 mm standard length)].

Synonyms: None.

FAO Names: En - Lake blackhand paradise fish; **Fr** - Barbure paradis à doigts noirs de lac; **Sp** - Barbudo paraíso de mano negra lacustre.

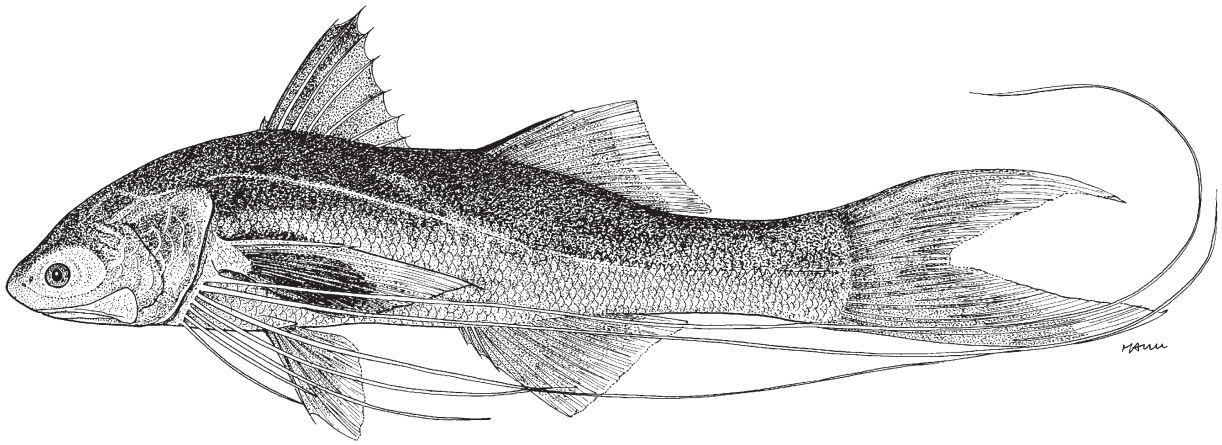

Fig. 144 ***Polynemus melanochir dulcis***

Diagnostic Features: A medium-sized species. Body depth at first dorsal-fin origin 23% of standard length; head length 27 to 28% (mean 28%) of standard length. Snout strongly pointed; occipital profile nearly straight. Posterior margin of maxilla extending well beyond level of posterior margin of adipose eyelid; upper-jaw length 14 to 15% (mean 14%) of standard length, greater than caudal-peduncle depth [10 to 11% (mean 10%) of standard length]; depth of posterior margin of maxilla [3 to 4% (mean 4%) of standard length] greater than eye diameter (3% of standard length); lip on lower jaw well developed, dentary teeth restricted to dorsal surface; teeth villiform in broad bands on palatines and ectopterygoids; vomerine tooth plate covered with skin and teeth absent. Posterior margin of preopercle serrated. First dorsal fin with VIII spines, all spine bases of similar thickness; second dorsal fin with I spine and 16 soft rays; anal fin with III spines and 11 or 12 (mode 12) soft rays, anal-fin base less than second dorsal-fin base; pectoral fin with 16 or 17 (mode 16) rays (all rays unbranched), its length 34 to 35% (mean 33%) of standard length, posterior tip not reaching to or just reaching to level of anal-fin origin; pectoral filaments 7; first (shortest) and second pectoral filaments extending beyond level of pelvic-fin origin but not reaching to level of posterior tip of pelvic fin; third pectoral filament reaching near anal-fin origin; fourth pectoral filament extending slightly beyond level of middle of anal-fin base or posterior base of anal fin; fifth pectoral filament extending slightly beyond caudal-fin base or posterior mid-distal margin of caudal fin; sixth and seventh [longest, its length 128 to 153% (mean 141%) of standard length] pectoral filaments extending well beyond posterior tips of caudal fin; caudal fin deeply forked, upper and lower caudal-fin lobes not filamentous, upper caudal-fin lobe 34 to 35% (mean 35%) and lower lobe 34 to 38% (mean 36%) of standard length. Pored lateral-line scales 71 or 72 (mode 71); lateral line simple, extending from upper end of gill opening to mid-distal margin of caudal-fin membrane; scale rows above lateral line 7, below 12 or 13 (mode 13). Gillrakers 12 on upper limb, 17 to 19 (mode 17) on lower limb, 29 to 31 (mode 29) total. Vertebrae 10 precaudal and 15 caudal; supraneural bones 2. Swimbladder absent. **Colour:** (preserved specimens) Head and body greyish black dorsally, pale whitish yellow ventrally; posterior tip of first dorsal fin intense black, other parts whitish yellow; posterior margins of second dorsal, pelvic, anal and caudal fins translucent (posterior margin of second dorsal fin blackish in a single specimen, BSKU 14850), anterior margin of second dorsal fin blackish, other parts whitish yellow; pectoral fin, except posterior tip and base, intense black (translucent in a single specimen, AMS I. 40968-001); base of pectoral filaments whitish yellow, becoming blackish posteriorly.

Geographical Distribution: Currently known only from Lake Tonle Sap, upper end of the lower Mekong River floodplain, Cambodia (Fig. 145).

Habitat and Biology: No data available.

Size: Maximum standard length at least 135 mm (Motomura and Sabaj, 2002).

Interest to Fisheries: Unknown.

Local Names: CAMBODIA: Trey pream.

Literature: Motomura and Sabaj (2002).

Remarks: ***P. melanochir dulcis*** and ***P. m. melanochir*** are uniquely characterized by the absence of vomerine teeth (present in all congeners). Likewise, both subspecies have a very black pectoral fin. Although the pectoral fin of ***P. paradiseus*** is occasionally tinged with

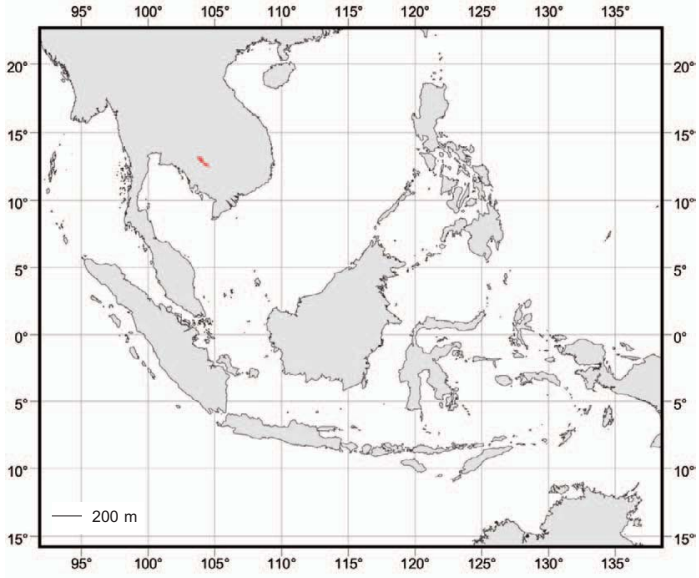

Fig. 145 ***Polynemus melanochir dulcis***
Known distribution

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