Species of the *Doumea chappuisi* Complex (Siluriformes, Amphiliidae) with the Descriptions of New Species from the Upper Sanaga River and Nyong River Basins

Carl J. Ferraris, Jr.¹, Paul Skelton², and Richard P. Vari³
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The *Doumea chappuisi* complex within the catfish family Amphiliidae is diagnosed on the form of the dorsolateral and ventrolateral processes of the vertebræ along the posterior portion of the body. Three species are recognized in the complex: *Doumea chappuisi* of the West African coastal river basins in Guinea, Guinea-Bissau, Cote d’Ivoire, and Liberia; *D. reidi*, new species, described herein from a portion of the upper Sanaga River in Nigeria; and *D. stilicauda*, new species, described herein from the Nyong River basin in Cameroon. Members of the complex are distinguished from each other on the basis of the overall body form, the caudal-peduncle length, the predorsal length, the head length, the degree of development of the pelvic fin in larger specimens, the anterior extent of the exposed vertebral processes along the ventral surface of the body, and details of the pigmentation pattern of the unbranched rays of the pectoral and pelvic fins.

Atfishes of the amphiliid genus *Doumea* range across a major portion of Africa from Angola through the Congo River basin and the Lower Guinea region to Guinea-Bissau. The seven species now recognized in the genus (Ferraris, 2007; Skelton, 2007a, 2007b) are all elongate streamlined dwellers of flowing water habitats with enlarged pectoral and pelvic fins and ventrally positioned mouths used for epibenthic grazing. Species of *Doumea* are characterized by a number of unusual internal modifications presumably correlated with this distinctive life style, most notably the expansion of the neural and hemal spines and the development of bilateral dorsolateral and ventrolateral processes (Harry, 1953:fig. 11e). *Doumea* had been distinguished within the Doumeinae by the absence of two series of superficial osseous plates that extend dorsolaterally from lateral of the base of the dorsal fin to the posterior end of the caudal peduncle and ventrolaterally from posterior of the pelvic-fin origin to the end of the caudal peduncle in the other genera of the subfamily (*Andersonia*, *Belonoglanis*, *Phractura*, and *Trachyglanis*; Poll and Gosse, 1995:pl. 58, figs. 343–351). These ossifications, which are sometimes referred to as bony scutes, are distal expansions of dorsolateral and ventrolateral extensions of the caudal vertebrae, which are characteristic of doumeins (Harry, 1953; Skelton, 2007a). Species of *Doumea* were reported to have the vertebral processes extending distally to the dermis, but were not known to penetrate to the skin surface (Skelton, 2007a:p.58). Harry (1953:220) commented, however, that “scutal elements are evident without dissection only in the smaller specimens” of *D. typica*. Our examination of individuals of that species across a range of sizes revealed that the vertebral processes are superficially evident through the relatively thin, somewhat transparent skin of juveniles, but nonetheless fail to reach the body surface.

Recent research has revealed the degree of development of the vertebral processes is more variable than previously suspected. In the course of a survey of specimens of *Doumea*, conducted as the initial stage of a comprehensive study of the Doumeinae, our attention quickly focused on an interesting specimen from the Nigerian portion of the upper Sanaga River. While closely resembling other species of *Doumea* in most features, the vertebral ossifications of the posterior portion of the body in that specimen extend through the dermis, albeit not expanding distally into bony plates comparable to those present in *Andersonia*, *Belonoglanis*, *Phractura*, and *Trachyglanis*. At approximately the same time, the WorldFish Centre was engaged in a fishery investigation of the ichthyologically poorly known middle Nyong River in Cameroon (Brummett et al., 2010). Those efforts yielded specimens of a species of *Doumea* that differed from *Doumea gracila*, which had been described previously from the Nyong River (Skelton, 2007a). That species also exhibited extensions of the dorsolateral and ventrolateral vertebral processes of the posterior portion of the body similar in form to those of the specimen from the upper Sanaga River. The Nyong and Sanaga River specimens, nonetheless, clearly represented different species.

This intermediate degree of development of the extensions of the vertebrae (penetrating the skin but not expanding into surface plates as in *Andersonia*, *Belonoglanis*, *Phractura*, and *Trachyglanis*) initially appeared unique to those two species within the Amphiliidae. Close examination of *Doumea chappuisi*, however, revealed that it possessed a similar condition. This moderate-sized and, until relatively recently, rare species was not reported to exhibit superficial ossifications of the dorsal and ventral surfaces of the posterior portion of the body. However, examination of specimens of a range of body sizes revealed that the vertebral processes extend to the skin surface in that region in all specimens. Externally, the ossifications in *D. chappuisi* and the species from the Nyong and Sanaga rivers appear as a narrow, slightly irregular series of bony processes that in combination form distinct ridges, rather than the plate-like scutes of *Andersonia*, *Belonoglanis*, *Phractura*, and *Trachyglanis*.

Herein, we report on the discovery of the two new species and provide a much needed redescription of *Doumea chappuisi*. Based on the shared and apparently derived presence of the extension of the caudal peduncular ridges

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onto the surface of the skin, we treat these three species as a subgroup of *Doumea* that we term the *D. chappuisi* complex. This morphology of the vertebral processes is intermediate between the absence of surface ossifications, which is characteristic of the other species of *Doumea*, and the possession of superficial bony plates in *Andersonia, Belonoglanis, Phractura*, and *Trachyglanis*. We modify the current diagnosis of *Doumea* to accommodate the three species with such restricted surface ossifications.

**MATERIALS AND METHODS**

Counts and measurements follow the methods outlined by Skelton (1984, 2007a), with fin-ray counts taken both from whole specimens and radiographs. Abbreviations in the text are standard length (SL) and head length (HL). Institutional abbreviations are as listed at http://www.asih.org/codons.pdf, with the addition of SAIAB for the South African Institute for Aquatic Biodiversity, Grahamstown.

**RESULTS**

**Doumea Sauvage, 1879**

Species of *Doumea* are firm-bodied, streamlined, and tapered with pointed heads, long, slender, and depressed caudal peduncles and large, falcate pectoral and pelvic fins (Skelton, 2007a:58). The mouth is generally small with thick papillose lips and tapered papillose barbels. The teeth are either minute, vestigial, or absent. Vertebral elaborations in *Doumea* lack distal expansions in the form of bony plates on the body surface contra the condition in *Andersonia, Belonoglanis, Phractura*, and *Trachyglanis*. In those genera, a series of plates run from lateral of the base of the dorsal fin to the end of the caudal peduncle and from the area slightly posterior of the origin of the pelvic fin, or even further anteriorly, to the end of the caudal peduncle (Poll and Gosse, 1995:pl. 58, figs. 343–351). Nonetheless, the distal portions of the vertebral processes of *D. chappuisi, D. reidi*, and *D. stilicauda*, new species, do penetrate through the dermis to the body surface as a series of narrow ossifications that together form an irregular margin of an osseous ridge and exhibit a pattern similar to, but with the exposed distal portions of the vertebral processes distinctly narrower than, *Phractura*, as illustrated in Poll and Gosse (1995:pl. 58, fig. 345). The form of the vertebral extensions to the surface of the body in the species of the *Doumea chappuisi* complex, penetrating as they do to the body surface, confronts us with two options: the creation of a new genus for these three species, or the modification of the definition of *Doumea* to include the presence of narrow ossifications on the surface of the caudal peduncle. Inasmuch as the generic level classification of the subfamily Doumeinae has yet to be critically analyzed phylogenetically, it is quite possible that such a future study would necessitate new generic level groupings with diagnoses that differ from those currently in use within the subfamily (Harry, 1953; Poll and Gosse, 1995). As such, we defer from proposing a new generic name until one is shown to be required by a phylogenetic analysis. In the interim, we modify the current diagnosis of *Doumea* to include all species of the Doumeinae that lack distal expansions of the dorsolateral and ventrolateral processes of the caudal vertebrae in the form of superficial interlocking plates.

**Doumea chappuisi** Pellegrin, 1933

Figures 1, 2; Table 1


**Diagnosis.**—Harry, 1953:195 [based on original description of species by Pellegrin, 1933].

*Diagnosis.*—*Doumea chappuisi* is distinguished from all species of *Doumea*, except *D. reidi* and *D. stilicauda*, by having the dorsolateral and ventrolateral vertebral processes extending through the skin to form longitudinal bony ridges from the region of the base of adipose fin posteriorly to the caudal-fin base and from slightly posterior of the pelvic-fin origin to the caudal-fin base. Exposed processes are in the shape of longitudinal bars with slightly corrugated surfaces that form irregular longitudinal ridges. *Doumea chappuisi* differs from *D. reidi* in caudal-peduncle length (22–29% SL, versus 31%, respectively), the posterior extent of the adpressed pelvic fin in specimens over 90 mm SL (falling short of the anterior limit of the anal fin, versus extending distinctly beyond that point, respectively), the anterior extent of the exposed vertebral processes along the ventral surface of the body (extending to slightly posterior of pelvic-fin origin, versus extending to the area lateral to the anal-fin base, respectively), and the pigmentation pattern of the dorsal surface of the unbranched rays of the pectoral and pelvic fins (uniformly pigmented, versus with series of irregular dark spots against a lighter background, respectively). *Doumea chappuisi* differs from *D. stilicauda* in predorsal length (32–37% SL, versus 27–30%, respectively), head length (18% SL, versus 15–17%, respectively), caudal-peduncle length (22–29% SL, versus 35–41%, respectively), and caudal-peduncle depth (7.3–14.5 times in caudal-peduncle length, versus 19.6–25.8 times, respectively).

**Description.**—Body elongate and progressively tapering posteriorly. Greatest body depth located slightly anterior of dorsal-fin origin and greatest width at anterior limit of pectoral-fin insertion. Body smooth skinned and firm.
Middorsal ridge present between terminus of dorsal-fin base and adipose-fin origin. Dorsal margins of neural arches apparent through skin in lightly colored individuals, but not extending to body surface. Abdominal region transversely flattened. Dorsal and ventral profiles of body progressively converge from anal-fin origin to posterior end of caudal peduncle. Lateral line complete, running along midlateral surface of body. Short, variably spaced and grouped, dorsal and ventral branches extending off main portion of lateral line. Exposed tips of dorsolateral vertebral processes apparent on skin surface from region of adipose-fin base posteriorly to caudal-fin base. Processes on ventral surface of body extend from slightly posterior of pelvic-fin origin to caudal-fin base. Exposed processes in shape of longitudinal bars with slightly corrugated surfaces, forming irregular longitudinal ridge. Caudal peduncle relatively elongate, slender, and dorsoventrally depressed over much of its length, but approximately as wide as high at caudal-fin base. Least depth of caudal peduncle approximately equal to length of eye.

Head profile broadly triangular from dorsal view with lateral margin slightly convex and snout tip rounded. Head pointed and depressed from lateral view. Snout long, relatively slender, and tapering anteriorly. Eye situated entirely within posterior half of head. Diameter of eye approximately one-half of interorbital distance. Distance from posterior naris to anterior margin of eye in smaller individuals less than distance between anterior naris and tip of snout; distances approximately equal in larger specimens. Posterior naris closer to anterior naris than to eye. Distance between nares of each side slightly less than distance of each to contralateral naris. Mouth subterminal, small, ovoid when open, with fleshy tuberculate upper lip and smooth firm lower lip, flanked to each side by tuberculate sections. Barbels short, tuberculate, and distally tapered. Maxillary barbel longest, reaching approximately to vertical through middle of snout length. Inner mandibular barbel shortest, with base situated slightly lateral of midline and of lateral margin of smooth portion of lower lip. Outer mandibular
barbel arises from angle of mouth and extends posteriorly approximately one-half length of branchiostegal membrane. Branchiostegal membrane continuous medially, with ventral portion of posterior margin straight or slightly concave. Gill slit extends posterodorsally to above pectoral-fin origin. Humeral process located above origin of gill opening, short. Supraoccipital process narrow, peg-like, separated by gap from small trilobed nuchal shield.

Dorsal fin falcate, unbranched ray longest. Tip of adpressed dorsal fin extends to vertical through middle of pelvic fin. Adipose-fin origin situated above middle of anal-fin base; fin small with length of base approximately one-third distance between posterior terminus of dorsal-fin base and adipose-fin origin; fin adnate, with posterior limit of fin situated posterior of vertical through anal-fin base, but not past posterior of vertical through tip of adpressed anal fin. Pectoral fin large and falcate with outer ray curved, pectinate, broad, and with fleshy pad covering ventral surface. Innermost pectoral-fin rays short, posterodorsally orientated, and adpressed to body wall. Tip of adpressed pectoral fin falling distinctly short of pelvic-fin origin and reaching to vertical through posterior terminus of dorsal-fin base. Pelvic fin large, slightly shorter than pectoral fin. Outer pelvic-fin ray pectinate with ventral surface covered by fleshy pad. Pelvic-fin origin located distinctly posterior of vertical through posterior end of dorsal-fin base. Tip of adpressed pelvic fin extending past anal-fin origin in smaller individuals, but falling short of that point in larger examined specimens. Anal fin large, with distal margin straight. Caudal fin forked, nearly symmetrical but with ventral lobe slightly longer than dorsal lobe. Fin lobes small and acutely pointed. Middle rays of caudal fin slightly more than one-half length of longest rays. Dorsal-fin rays i,6,i or i,7; pectoral-fin rays i,9,i,9,i, or i,10; pelvic-fin rays i,5; anal-fin rays iii (rarely iv),5–7,i; principal caudal-fin rays i,6,7,i (rarely i,7,6,i).

Coloration in alcohol.—Body coloration of examined specimens variable; ranging from light tan overall with scattered small dark chromatophores through darker with distinct pigment patterns on overall dark brown body. Pigmentation in all conditions darker dorsally with brown coloration extending ventral of lateral line on abdomen and caudal peduncle, more so in darker individuals. Boundary between brown pigmentation of dorsal and dorsolateral regions and lighter coloration of ventrolateral and/or ventral regions.

Table 1. Proportional Measurements for the Species of the *Doumea chappuisi* Complex. *Doumea chappuisi* based on MRAC 89-031-P-0028-0056 and MNHN 1979-0121 (*n* = 13) and *D. stilicauda* on holotype and 12 paratypes. Values 1 to 10 are percentages of standard length; values 12 to 16 percentages of head length; and values 17 to 19 are cited ratios.

<table>
<thead>
<tr>
<th></th>
<th><em>D. chappuisi</em></th>
<th><em>D. reidi</em></th>
<th><em>D. stilicauda</em></th>
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<tr>
<td></td>
<td>Min–max</td>
<td>Mean</td>
<td>Min–max</td>
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<td>Standard length (mm)</td>
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<td>108–175</td>
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<td>1 Predorsal length</td>
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<td>19–23</td>
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<td>8 Pectoral-fin length</td>
<td>21–27</td>
<td>24.1</td>
<td>19–23</td>
</tr>
<tr>
<td>9 Pelvic-fin length</td>
<td>16–23</td>
<td>20.1</td>
<td>16–20</td>
</tr>
<tr>
<td>10 Posterior limit of insertion pelvic-fin base to anus</td>
<td>5–9</td>
<td>7.7</td>
<td>6–11</td>
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<td>11 Head depth</td>
<td>44–58</td>
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<td>47–55</td>
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<td>12 Head width</td>
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<td>13 Snout length</td>
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<td>14 Orbit diameter</td>
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<td>15 Interorbital width</td>
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<td>16 Postorbital length</td>
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<td>0.48–0.57</td>
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<td>18 Caudal-peduncle length/Caudal-peduncle depth</td>
<td>7.3–14.5</td>
<td>8.8</td>
<td>19.6–25.8</td>
</tr>
<tr>
<td>19 Body width/Body depth</td>
<td>1.0–1.4</td>
<td>1.1</td>
<td>1.0–1.4</td>
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</table>
irregular albeit relatively distinct in specimens with well-developed darker coloration. Darker individuals with more intense pigmentation extending further ventrally and then gradually becoming somewhat lighter. Specimens with distinct pigmentation patterns having irregular midlateral dark pigmentation continuous dorsally with ventral portions of four distinct saddles of dark pigmentation extending ventrally from middorsal line. First saddle extends longitudinally from supraoccipital-spine tip to beyond origin of dorsal fin and angles posterovertrventrally; second saddle begins posterior of dorsal-fin base and terminates distinctly anterior of adipose-fin origin; third saddle originates slightly anterior of anterior limit of adipose-fin base and extends posteriorly along two-thirds of fin base; fourth saddle begins somewhat posterior of adipose-fin base and continues posteriorly for distance about equal to three orbital diameters and continuous posteriorly with irregular dark middorsal stripe. Combination of dark brown midlateral stripe and dark brown saddles enclose more lightly colored saddles. Ventrolateral portion of abdomen and ventral part of caudal peduncle with scattered dark chromatophores, but chromatophores absent on ventral portion of abdomen even in darker examined specimens. Lateral-line canal variably paler than background coloration, more obviously so posteriorly in many specimens.

Dorsal and lateral portions of head brown, with scattered darker regions throughout. Ventral part of head tan with fine darker pigmentation ventrolaterally in many individuals. Maxillary barbel dusky, especially dorsally. Mandibular barbels unpigmented.

Dorsal surfaces of leading unbranched pectoral- and pelvic-fin rays ranging from tan to brown, without any distinct coloration pattern. Dorsal surface of both fins darker brown basally and with medially narrowing band of dark brown pigmentation on distal half of rays, but pigmentation falls short of distal margin. Ventral surfaces of paired fins, particularly fleshy basal pad, more lightly pigmented, but with darker pigmentation of dorsal surface of rays apparent to varying degrees. Dorsal-fin rays pale to dusky, and with broad, dark patch on distal portions of anterior rays. Some individuals with dark brown band on basal portions of posterior fin rays.

**Distribution.**—Examined specimens of *Doumea chappuisi* originated in the coastal river basins of western Africa (Cote d’Ivoire, Guinea, Liberia; Fig. 2). Lévêque et al. (1989:110, 119) reported the species from the portion of the Corubal River in Guinea Bissau. The range of the species includes, but probably is not limited to, the Gô, Cavally, St. John’s, and Corubal river basins. *Doumea chappuisi* was the only species of *Doumea* found among the examined specimens of the genus from this region.


**Doumea reidi, new species**

Figs 2, 3; Table 1

*Doumea* sp. cf. *thysi*.—Reid, 1995:4, 17, 33, color plates 11, 12 [Nigeria, Gashaka Gumti National Park, Mayo Melafa, stream near Mayo Dande Village; Sanaga River basin; habitat and water conditions].

**Holotype.**—USNM 337914, 93 mm SL, Nigeria, Gashaka Gumti National Park, Mayo Dande Village, tributary of Banyo River, of Mbam River basin [Sanaga River drainage] near border with Cameroon, 6°59’00”N, 11°39’30”E, approximately 1525 m asl, 13 April 1994, G. M. Reid.

**Diagnosis.**—*Doumea reidi* is distinguished from all species of *Doumea*, except *D. chappuisi* and *D. stilicauda*, by having the dorsolateral and ventrolateral vertebral processes extending through the dermis to form longitudinal bony ridges from the base of the adipose fin posteriorly to the caudal-fin base and from slightly posterior of the anal-fin origin to the caudal-fin base. The exposed processes are in the shape of longitudinal bars with slightly corrugated surfaces that together form an irregular longitudinal ridge. *Doumea reidi* differs from *D. chappuisi* in caudal-peduncle length (31% SL, versus 22–29%, respectively), the posterior extent of the adipose fin in specimens over 90 mm SL (pelvic fin extending distinctly anterior of limit of the anal fin, versus falling short of that point), the anterior extent of the exposed vertebral processes along the ventral surface of the body (extending to the area lateral to the anal-fin base, versus extending to slightly posterior of pelvic-fin origin, respectively), and the pigmentation pattern of the dorsal surface of the unbranched rays of the pectoral and pelvic fins (with a series of irregular dark spots against a lighter background, versus uniformly pigmented, respectively). *Doumea reidi* differs from *D. stilicauda* in predorsal length (33% SL, versus 27–30%, respectively), head length (18% SL, versus 15–17%, respectively), caudal-peduncle length (31% SL, versus 35–41%, respectively), and caudal-peduncle depth (11.8 times in caudal-peduncle length, versus 19.6–25.8 times, respectively).

**Description.**—Body elongate and progressively tapering posteriorly. Greatest body depth located slightly anterior of dorsal-fin origin and greatest width at anterior limit of pectoral-fin insertion. Head and body with numerous small papillae; papillae distributed over lateral and dorsal portions of head. Ventral surface of head with close-set papillae arranged in irregular rows. Rows diverging laterally from region somewhat posterior of lower lip. Papillae also present on lateral and dorsal surfaces of anterior portion of body. Middorsal ridge present between terminus of dorsal-fin base and adipose-fin origin. Dorsal margins of neural arches apparent through skin, but not extending to body surface. Abdominal region transversely flattened. Dorsal and ventral profiles of body progressively converge from anal-fin origin to posterior end of caudal peduncle. Exposed tips of dorsolateral vertebral processes apparent on skin surface from region of base of adipose fin posteriorly to caudal-fin base. Processes on ventral surface of body extend from slightly posterior of anal-fin origin to caudal-fin base. Exposed processes in shape of longitudinal bars with slightly corrugated surfaces that jointly form irregular longitudinal ridge. Lateral line complete and runs along midlateral surface of body. Short, variably spaced and grouped dorsal
and ventral branches extend off from main portion of lateral line. Caudal peduncle relatively elongate, slender, and dorsoventrally depressed over much of its length, but approximately as wide as high at caudal-fin base. Least depth of caudal peduncle approximately equal to two-thirds length of eye.

Head broadly triangular from dorsal view with lateral margin very slightly convex and snout tip rounded. Head pointed and depressed from lateral view. Snout long, relatively slender, and anteriorly tapering. Eye situated entirely within posterior half of head. Diameter of eye approximately one-half of interorbital distance. Distance from posterior naris to anterior margin of eye approximately equal to distance between anterior naris and tip of snout. Posterior naris distinctly closer to anterior naris than to eye.

Distance between nares of each side slightly less than distance of each to contralateral naris. Mouth subterminal, small, ovoid when open, with fleshy tuberculate upper lip and smooth firm lower lip, flanked to each side by tuberculate sections. Barbels short, tuberculate and distally tapered. Maxillary barbel longest, reaching approximately to vertical through middle of snout length. Inner mandibular barbel shortest, with base located slightly lateral of midline and of lateral margin of smooth portion of lower lip. Outer mandibular barbel arises from angle of mouth and extends posteriorly approximately one-half length of branchiostegal membrane. Branchiostegal membrane continuous medially with ventral portion of posterior margin slightly concave. Gill slit extends posterodorsally to above pectoral-fin origin. Humeral process located above origin of gill opening, short.

**Fig. 3.** *Doumea reidi*, new species, holotype, 93 mm SL, USNM 337914, Nigeria, Mayo Dande Village, Mayo Melafa, tributary of Banyo River, Mbam River basin [Sanaga River drainage] near border with Cameroon, 6°59′00″N, 11°39′30″E. Dorsal, lateral, and ventral views.
Supraoccipital process narrow, peg-like, separated by gap from small trilobed nuchal shield.

Dorsal fin falcate, unbranched ray longest. Tip of adpressed dorsal fin extends to vertical through middle of pelvic fin. Adipose-fin origin situated above middle of anal-fin base; fin small with length of base approximately one-third of distance between posterior terminus of dorsal-fin base and adipose-fin origin; fin adnate, with posterior extent of fin extending past vertical through posterior limit of anal-fin base, but not posterior of vertical through tip of adpressed anal fin. Pectoral fin large and falcate with outer ray curved, pectinate, broad, and with fleshy pad covering ventral surface. Innermost pectoral-fin rays short, posterodorsally orientated, and adpressed to body wall. Tip of adpressed pectoral fin falling distinctly short of pelvic-fin origin and reaching to vertical through posterior terminus of dorsal-fin base. Pelvic fin large, slightly shorter than pectoral fin. Outer pelvic-fin ray pectinate with ventral surface covered by fleshy pad. Pelvic-fin origin located distinctly posterior of vertical through posterior end of dorsal-fin base. Tip of adpressed pelvic fin extending well past anal-fin origin. Anal fin large, with distal margin straight. Caudal fin forked and nearly symmetrical but with ventral lobe slightly longer than dorsal lobe. Lobes small and sharply pointed with middle rays of caudal fin approximately one-half length of longest rays. Dorsal-fin rays i,6; pectoral-fin rays i,10; pelvic-fin rays i,5; anal-fin rays iii,8; principal caudal-fin rays i,6,7,1.

**Coloration in alcohol.**—Body with tan ground coloration, overlain with brown dorsally. Brown coloration extends somewhat ventral of lateral line across abdomen, but limited to region dorsal of lateral line on caudal peduncle. Boundary between brown and tan pigmentation distinct. Brown pigmentation overlain with irregularly sized and placed darker spots of varying sizes and shapes. Midlateral portion of body with irregular stripe of dark pigmentation; stripe more obvious anteriorly. Dorsal and dorsolateral portions of body with four distinct, dark brown middorsal saddles continuous ventrally with midlateral stripe. Anterior saddle extends from tip of supraoccipital-spine to middle of dorsal fin; second saddle extends from slightly posterior of dorsal-fin base about three-quarters of distance to adipose-fin origin, but only reaches midlateral stripe along its posterior region; third saddle begins somewhat anterior to adipose-fin origin and extends along much of base of fin and angles anteroventrally to midlateral stripe; small fourth saddle starts slightly posterior of adipose-fin base. Ventrolateral portion of abdomen and ventral part of caudal peduncle covered with scattered dark chromatophores, but with chromatophores absent ventrally on anterior part of abdomen. Lateral line canal pale for entire length.

Dorsal and lateral portions of head brown, with scattered slightly darker spots throughout. Ventral part of head tan overall, with fine darker pigmentation ventrolaterally but lacking chromatophores ventrally. Maxillary barbel dusky, more so dorsally. Mandibular barbels unpigmented.

Dorsal surface of pectoral and pelvic fins with scattered dark spots on dorsal surface of unbranched rays that form distinct, but irregular pattern. Dorsal surface of branched rays of both fins darker basally and with dark pigmentation in form of medially narrowing band on distal half of rays, but with band falling short of distal margin. Ventral surface of fins, particularly fleshy basal pad, lightly pigmented, but with darker pigmentation of dorsal surface of rays apparent to limited degrees, more so in case of pelvic fin. Dorsal-fin rays pale with some darker brown areas on distal portions of anterior rays. Adipose fin with dusky, posterodorsally angled band on central portion bordered by paler regions anteriorly and posteriorly. Caudal fin with scattered dark spots, more so on lower lobe. Fleshy pad overlying base of caudal-fin rays with dark spots. Anal-fin rays dusky, with scattered darker spots, particularly on distal one-third of anterior rays.

**Coloration in life.**—Color plates in Reid (1995:pls. 11, 12) show that coloration is overall comparable to that of preserved specimen other than that lighter areas are more cream colored in life.

**Distribution and reproduction.**—**Doumea reidi** is known only from a single specimen from the type locality in eastern Nigeria, not far from the border with Cameroon (Fig. 2). The type locality is a stream close to the Village of Mayo Dande and drains to the Banyo River and then the Mbam River of the Sanaga River basin (Reid, 1995:33). The holotype has an extensive series of papillae on the head and anterior portion of the body comparable in form to those present in one of the paratypes of **D. stilicauda** (see comments under species account). The specimen of **D. stilicauda** was a ripening female and the presence of the papillae in the holotype of **D. reidi** may indicate that it was entering into the breeding season when collected.

**Habitat.**—The type locality of **Doumea reidi** is a cool, briskly flowing, upland stream less than 4 m wide and less than 1.5 m maximum depth (Reid, 1995:34). The substratum was reported to consist of large, granitic boulders interspersed among deposits of coarse sand, mud, and leaf litter. The type locality was the only location in the Gashaka Gumti National Park where the genus was recorded; however, most fish collections made during the ichthyological survey of the park were from the Benue River system, which flows west through Nigeria before emptying into the Niger River.

**Etymology.**—The species name, *reidi*, honors Dr. Gordon McGregor Reid, of the North of England Zoological Society, who collected the holotype and who has dedicated a large portion of his career helping to protect, and improve our understanding of, wildlife and freshwater fishes worldwide.

**Remarks.**—In addition to **Doumea reidi**, one other species of the genus is known from the Sanaga River, that being **D. sanaga**, an endemic of the portions of that river system in Cameroon (Skelton, 2007a, 2007b). **Doumea reidi** differs from **D. sanaga** in the degree of extension of the dorsolateral and ventrolateral projections of the vertebral on the middle and posterior portions of the body (reaching through skin and forming bony ridges along surface, versus covered by skin), in the overall head and body form (compare lateral view of Fig. 3 with Skelton, 2007a:fig. 11), the length of the predorsal portion of the body (33% SL, versus 34–37%, respectively), the head depth (49% HL, versus 51–60%, respectively), the orbital diameter (12% SL, versus 13–18%, respectively), and the pigmentation pattern of the dorsal surface of the unbranched rays of the pectoral and pelvic fins (with distinct dark marks against a light background, versus uniformly pigmented, respectively).
**Doumea stilicauda**, new species
Figures 2, 4; Table 1

_Holotype._—SAIAB 80182, 158 mm SL, Cameroon, Sud Region, Pont So'o, So'o River, Nyong River system, from indigenous fish trap along river channel, 3°19′N, 11°29′E, April 2007, R. Etoundi Owona and R. E. Brummett.

_Paratypes._—All collected at type locality by same collectors and method: SAIAB 85547 (formerly SAIAB 80182, in part), 1, 155 mm SL, collected with holotype. SAIAB 80791, 6, 107.5–162 mm SL; SAIAB 80792, 2, 119–175 mm SL; USNM 396012 (formerly SAIAB 80791, in part), 2, 138–153 mm SL, March 2008. SAIAB 80798, 1, 144 mm SL, May 2008.

**Diagnosis.**—_Doumea stilicauda_ is distinguished from all species of _Doumea_, except _D. chappuisi_ and _D. reidi_, by having the dorsolateral and ventrolateral vertebral processes extending through the dermis to form longitudinal bony ridges from slightly anterior to the base of the adipose fin posteriorly to the caudal-fin base and from somewhat anterior of the anal-fin origin to the caudal-fin base. Exposed processes are in shape of longitudinal bars with slightly corrugated surfaces that together form irregular longitudinal ridges. _Doumea stilicauda_ is readily distinguishable from _D. chappuisi_ in predorsal length (27–30% SL,
Description.—Body elongate and progressively tapering posteriorly. Greatest body depth located slightly anterior of dorsal-fin origin other than in specimens with extended abdomen, in which greatest depth at middle of abdomen. Greatest body width at anterior limit of pectoral-fin insertion other than in specimens with extended abdomen, in which greatest width at middle of abdomen. Head and body of holotype covered with numerous very small papillae. Papillae distributed over lateral and dorsal portions of head. Ventral surface of head with small, apparently developing, close set papillae arranged in irregular rows diverging from region somewhat posterior of lower lip; papillae in this region most obvious posteriorly. Small papillae also present on lateral and dorsal surfaces of anterior portion of body. Middorsal ridge present between terminus of dorsal-fin base and adipose-fin origin. Dorsal margins of neural arches apparent through skin, but not extending to body surface. Abdominal region transversely flattened other than in specimens with distended abdomens in which abdomen somewhat transversely convex. Dorsal and ventral profiles of body progressively converge from anal-fin origin to posterior end of caudal peduncle. Exposed tips of dorsolateral vertebral processes apparent on skin surface from region slightly anterior of base of adipose fin posteriorly to caudal-fin base. Processes on ventrolateral surface of body extend from somewhat anterior of anal-fin origin to caudal-fin base. Exposed processes in shape of longitudinal bars with slightly corrugated surfaces that form irregular longitudinal ridge. Lateral line complete, running along midlateral surface with short, variably spaced and grouped dorsal and ventral branches extending from main portion of system. Caudal peduncle relatively elongate, slender, and dorsoventrally depressed over much of its length, but approximately one and one-half times wide as high at caudal-fin base. Least depth of caudal peduncle approximately equal to two-thirds length of eye.

Head broadly triangular from dorsal view with lateral margin very slightly concave to anterior margin of opercle and then slightly convex to posterior limit of opercle and snout tip rounded. Head pointed and depressed from lateral view. Snout long, relatively slender, and anteriorly tapering. Eye situated entirely within posterior half of head. Diameter of eye slightly less than one-half of interorbital distance. Distance from posterior naris to anterior margin of eye distinctly less than distance between anterior naris and tip of snout. Posterior naris distinctly closer to anterior naris than to eye. Distance between nares of each side slightly less than distance of each to contralateral naris. Mouth subterminal, small, ovoid when open, with fleshy tuberculate upper lip and smooth firm lower lip, flanked to each side by tuberculate sections. Barbels short, tuberculate, and distally tapered. Maxillary barbel longest, reaching posteriorly approximately to vertical through middle of snout length. Inner mandibular barbel shortest, with base located slightly lateral of midline and of lateral margin of smooth portion of lower lip. Outer mandibular barbel arises from angle of mouth and extends posteriorly approximately one-half length of branchiostegal membrane. Branchiostegal membrane continuous medially with central region of posterior margin slightly concave. Gill slit extends posterodorsally to above pectoral-fin origin. Humeral process above origin of gill opening, short. Supraoccipital process narrow, peg-like, separated by gap from small trilobed mucal shield.

Dorsal fin falcate, unbranched ray longest. Tip of adpressed dorsal fin extends to vertical through middle of pelvic fin. Adipose-fin origin situated above middle of anal-fin base; fin small with length of base approximately one-third of distance between posterior terminus of dorsal-fin base and adipose-fin origin; fin adnate, with posterior extent of fin extending past vertical through posterior limit of anal-fin base, but not posterior of vertical through tip of adpressed anal fin. Pectoral fin large and falcate with outer ray curved, pectinate, broad, and with fleshy pad covering ventral surface; innermost pectoral-fin rays short, posterodorsally orientated, and adpressed to body wall other than when fin fully extended. Tip of adpressed pectoral fin falling distinctly short of pelvic-fin origin and reaching nearly to or slightly beyond vertical through posterior terminus of dorsal-fin base. Pelvic fin large, slightly shorter than pectoral fin, outer ray pectinate with ventral surface with fleshy pad. Pelvic-fin origin located distinctly posterior of vertical through posterior end of dorsal-fin base. Tip of adpressed pelvic fin extending slightly beyond anal-fin origin. Anal fin large, with distal margin straight. Caudal fin forked and nearly symmetrical but with ventral lobe slightly longer than dorsal lobe. Lobes small and sharply pointed with middle rays of caudal fin slightly less than one-half length of longest rays. Dorsal-fin rays i,6; pectoral-fin rays i,11; pelvic-fin rays i,5; anal-fin rays iii (rarely ii or iv);6; principal caudal-fin rays i,7,6,1.

Coloration in alcohol.—Body with tan to light brown ground coloration and distinctly brown dorsally and dorsolaterally. Brown coloration extends somewhat ventral of lateral line across abdomen. Boundary between brown and tan pigmentation distinct. Brown pigmentation overlain with irregularly sized and placed darker spots of varying sizes and shapes with enclosed variably present light regions. Some specimens with irregular stripe of dark pigmentation along midlateral portion of body; stripe more obvious anteriorly. Dorsal and dorsolateral portions of body with four, variably obvious, distinct, dark brown saddles extending ventrally from middorsal region. Anterior saddle extends from tip of supraoccipital spine to middle of dorsal fin; second saddle extends from slightly posterior of dorsal-fin base about three-quarters of distance to adipose-fin origin; third saddle begins somewhat anterior to adipose-fin origin and extends along much of base of; small fourth saddle starts slightly posterior of adipose-fin base. Ventrolateral portion of abdomen with scattered dark chromatophores in some specimens, but with chromatophores absent ventrally on anterior part of abdomen. Lateral line canal irregularly more lightly pigmented than surrounding regions in some specimens. Distinct, narrow, dark stripe extending from somewhat posterior of terminus of pelvic-fin base posterior to above base of anal fin.
Dorsal and lateral portions of head brown, with scattered slightly darker spots throughout. Ventral part of head tan overall, with some fine darker pigmentation ventrolaterally but lacking chromatophores ventrally. Maxillary barbel dusky, especially dorsally. Mandibular barbels pale, without dark chromatophores.

Dorsal surface of pectoral fin dark brown with variably developed lighter band extending from midsection of anterior rays to distal portion of posterior rays. Distal margin of fin hyaline. Ventral surface of fin with dusky band extending across fin approximately three-quarters of distance from base, but with distal portion of fin hyaline. Dorsal surface of pelvic fin dusky other than for distal margin and basal portion of middle rays. Ventral surface of fin with dusky band extending across fin approximately three-quarters of distance from base, but with distal portion of fin hyaline. Dorsal-fin rays dusky overall, more so on unbranched ray and on rays and membranes distally. Adipose and caudal fins dusky. Fleshy pad overlying base of caudal-fin rays darkly pigmented. Anal-fin rays dusky over distal one-third of anterior rays, but with margin hyaline. Some specimens fixed in alcohol show bluish gray color with spots evident on dorsal head and body.

**Habitat.**—The Nyong River is a “blackwater” rainforest system with low pH waters (mean pH 6.2; Brummett et al., 2010). At one study site along the So’o River, a large forest tributary of the Nyong River, local fishers constructed a wooden palisade barrier dam with a chute basket traps known as an “alami” (Fig. 5). This indigenous trap was effective in catching a wide variety of fish species, some of which were previously unknown from the Nyong River system. Included among these were the samples of *Doumea stilicauda* that form the basis of the species description.

**Distribution.**—*Doumea stilicauda* is known only from the So’o River, a tributary of the Nyong River, Cameroon (Fig. 2).

**Etymology.**—The species name, *stilicauda*, from the Latin *stilus*, a stake, and *cauda*, tail, refers to the stake-like caudal peduncle; treated as a noun.

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**LITERATURE CITED**


