Identification of *Sudanonautes aubryi* (H. Milne-Edwards, 1853)  
(Brachyura: Potamoidea: Potamonautidae) from West and Central Africa

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(With 3 figures)

**Keywords:** Freshwater Crab; Taxonomy, Potamoidea, Potamonautidae, Africa, *Paragonimus*, Distribution

**Introduction**

Four species of freshwater crabs of the genus *Sudanonautes* (Bott, 1955) - *S. aubryi* (H. Milne-Edwards, 1853), *S. africanus* (A. Milne-Edwards, 1869), *S. floweri* (De Man, 1901), and *S. granulatus* (Balss, 1929) - serve as second intermediate hosts of the human lung fluke *Paragonimus* in Nigeria and Central Africa (VOELKER, SACHS, VOLKMER & BRABAND, 1975; VOELKER & SACHS, 1977; NOZAIS, DOUCET, DUNAN & N'DRI, 1980; CUMBERLIDGE, 1993a). However, distinguishing between these species is not easy, and specimens belonging to all four species have been wrongly identified in the literature.

The taxonomy of *S. aubryi*, the subject of the present work, has long been unstable, making identification of this species especially difficult. For example, in the last major revision of the freshwater crabs of Africa (Bott, 1955), this species appeared as *S. (S.) d. decazi* (A. Milne-Edwards, 1886) with *Potamon (Potamonautes) pobeguini*, Rathbun, 1905, *Potamon decazi granulata*, Balss, 1929, and *P. (P.) regnier*, Rathbun, 1905, listed as synonyms. In a later work, that author (Bott, 1964) judged *S. (S.) d. decazi* itself to be a junior synonym of *S. (S.) p. pelii* (Herklots, 1861).

In the present study, *Thelphusa pelii*, *T. decazei*, and *P. (P.) pobeguini* are judged to be synonyms of *S. aubryi*, following examination of type material. This synonymization of *T. pelii* with *S. aubryi* represents a
return to the original concept of the species proposed by earlier workers (H. MILNE-EDWARDS, 1853; A. MILNE-EDWARDS, 1887; DE MAN, 1901).

Ambiguous descriptions of *S. aubryi* in the literature have led to the misidentification of specimens of *S. aubryi* as *S. floweri* (RATHBUN, 1905; CAPART, 1954; BOTT, 1955).

Furthermore, the present investigation has revealed that *S. aubryi* has also been wrongly identified as *S. africanus* in reports on taxonomy (BOTT, 1959; MONOD, 1977, 1980), salt and water balance (LUTZ, 1969), growth (EJIKE, 1972), ecology (BERTRAND, 1974), and parasitology (VOELKER, SACHS, VOLKMER & BRABAND, 1975; fig. 6).

Because the male type of *S. aubryi* from Gabon is preserved dry, the gonopods and mandible of the type of this species have never been described. These characters are described here from other specimens of *S. aubryi* from Nigeria preserved in alcohol, which were selected following detailed examination of the male and female types from Gabon. Gonopod 1 of *S. aubryi* was found to be distinct (Fig. 1 d - f). When considered in conjunction with other characters of the carapace (Fig. 2 a - c) and mandibies (Fig. 1 a - c), it can be used to identify the species unequivocally. The aim of the present study is to clarify the confused taxonomy of *S. aubryi*. This, in turn, will make it easier for other workers to identify the species, and will allow its distribution to be updated.

**Methods**

The carapace and cheliped features of the dried male and female types of *S. aubryi* from Gabon were noted. The species is completely redescribed here from a specimen from Nigeria (Figs. 1 a - g, 2 a - l). The left mandible and left gonopods 1 and 2 were illustrated following removal from the specimen in order to describe these structures under magnification (Fig. 1 a - g). Reference was also made to the types of *T. pelii, T. decazei, P. (P.) pobeguini, T. africanus, P. decazei granulata*, and *P. aubryi monodi* Balss, 1929. Photographs of the lectotype of *T. pelii* are available in BOTT (1964, plate 2, figs. 1 - 2), and photographs of the types of *T. decazei* and *P. (P.) pobeguini* are given in RATHBUN (1904, TVI, plate XVI, figs. 3, 8 respectively). *Sudanonautes granulatus* has been redescribed in detail by CUMBERLIDGE (1993a). Carapace length, carapace width, carapace height, and front width were recorded from 59 specimens using digital callipers. Carapace proportions were calculated according to carapace length. These data were pooled and used for descriptions of growth (Fig. 3 a, b). Statistical comparisons between species were made between sexually mature adults only (Table 1). All geographical localities for *S. aubryi* given in the present study result from the direct examination of specimens, since distribution records in the literature are based mostly on unreliable identifications.

The following abbreviations are used: AMNH, American Museum of Natural History, New York, USA; IFAN, Institute Fondamental d'Afrique Noir, Dakar, Senegal; MCZ, Museum of Comparative Zoology, Harvard, MA, USA; MNHN,
Fig. 1. *Sudanonautes aubryi*, adult male from Tiga Lake, Nigeria, (CW 66 mm), NMU 6.XI.1982. (a), left mandible anterior view; (b), left mandible posterior view; (c), left mandible superior view; (d), left gonopod 1, caudal view; (e), left gonopod 1, cephalic view; (f), left gonopod 1, superior view; (g), left gonopod 2, caudal view. Scale bar equals 5 mm (a - c); 7 mm (d - g).
Fig. 2. *Sudanonautes aubryi*, adult male from Tiga Lake, Nigeria, (CW 66 mm), NMU 6.XI.1982. (a), whole animal, dorsal aspect; (b), carapace, frontal aspect; (c), carapace showing detail of epibranchial corner; (d), sternum; (e), left third maxilliped; (f), abdomen; (g), carpus, propodus, and dactylus of right cheliped, frontal view; (h), carpus, propodus, and dactylus of left cheliped, frontal view; (i), carpus, and merus of right cheliped, superior view; (j), carpus, and merus of right cheliped, inferior view; (k), left pereiopod 2; (l), *Thelphusa petiti* Herklots, 1861, NNH 322, lectotype, adult male from St. George d'Elmina, Ghana (CW 54 mm), propodus, and dactylus of right cheliped, frontal view. Scale bar equals 10 mm (a, b, d, f - l), 5 mm (c), and 2.5 mm (e).
Fig. 3. Comparisons of 99 specimens of *Sudanonautes aubryi*. a, dimensions of the carapace (CW, CH, FW) compared to body size (CL), r values (all at df = 98) indicate a highly significant correlation (P < 0.001) between size classes. b, relative proportions of carapace width (CW/CL) compared to body size (CL), r value (at df = 98) indicates no significant correlation (P > 0.05) between size classes; relative proportions of carapace height (CH/CL) and front width (FW/CL), r values (both at df = 98) indicate a highly significant correlation (P < 0.001) between size classes.
Table 1

Means (± SE) of ratio of carapace width (CW), carapace height (CH), and front width (FW), to body size (CL) of adult *Sudanonautes aubryi* compared to the adults of four closely related species of *Sudanonautes* from Nigeria and Central Africa.

<table>
<thead>
<tr>
<th>Species</th>
<th>CW/CL</th>
<th>CH/CL</th>
<th>FW/CL</th>
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<tbody>
<tr>
<td><em>Sudanonautes aubryi</em></td>
<td>1.37 ± 0.01</td>
<td>0.52 ± 0.01</td>
<td>0.38 ± 0.002</td>
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<tr>
<td>(n = 63)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><em>Sudanonautes floweri</em></td>
<td>1.52±0.01</td>
<td>0.61±0.01</td>
<td>0.38 ± 0.003</td>
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<tr>
<td>(n = 65)</td>
<td></td>
<td></td>
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<tr>
<td><em>Sudanonautes africanus</em></td>
<td>1.38 ± 0.01</td>
<td>0.43±0.003</td>
<td>0.38±0.004</td>
</tr>
<tr>
<td>(n = 26)</td>
<td></td>
<td></td>
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<tr>
<td><em>Sudanonautes granulatus</em></td>
<td>1.42±0.01</td>
<td>0.5±0.01</td>
<td>0.41 ± 0.01</td>
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<tr>
<td>(n = 33)</td>
<td></td>
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<tr>
<td><em>Sudanonautes monodi</em></td>
<td>1.49±0.01</td>
<td>0.58±0.004</td>
<td>0.39 ± 0.004</td>
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<tr>
<td>(n = 23)</td>
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* = Proportion significantly different from that of *S. aubryi* at 95% confidence limits.

Systematics

*Sudanonautes aubryi*, (H. Milne-Edwards, 1853).

*Thelphusa aurantia*, Herklots, 1851, p. 5, pl. 1, fig. 2.


*Thelphus decazei*, A. Milne-Edwards, 1886, p. 150; 1887, p. 127, pl. 8, fig. 7.

Identification of *Sudanonautes aubryi*

*Potamon (Potamonautes) decazei*, (A. Milne-Edwards, 1886) – Rathbun, 1900, p. 283; 1904, VI, pl. 16, Potamidae (VIII), fig. 3 (type, Franceville); 1905, p. 195; Sendler, 1912, p. 199; Balss, 1914a, p. 405 (ZIM K13556, CW 48.5 mm, K13557); Balss, 1914b, p. 104; 1929, part.

*Potamon (Potamonautes) pobeguini*, Rathbun, 1904, VI, pl. 16, Potamidae (VIII), fig. 8 (type, Batah); 1905, p. 195 - 197.

*Potamon (Potamonautes) aubryi*, (H. Milne-Edwards, 1853) – Rathbun, 1900, p. 283 (not p. 282); 1904, VI, pl. 17, Potamidae (IX), fig. 4 (type, Gabon); 1905 VII, p. 191, part, only the female from Gabon, not the specimens from Cabinda, Zaire, and Gabon; De Man, 1901, p. 94, 98 - 100; Balss, 1914a, p. 405 (ZIM K13557 only); Roux, 1927, p. 237.

*Potamonautes decazei granulata*, Balss, 1929, part.

*Potamonautes pobeguini*, (Rathbun, 1905) – Balss, 1914b, p. 104; 1929, part.


*Potamon pobeguini*, (Rathbun, 1905) – Chace, 1942.

*Potamon decazei*, (A. Milne-Edwards, 1886) – Chace, 1942; Capart, 1954, p. 830, figs. 12, 15.

*Potamon pobeguini*, (Rathbun, 1905) – Chace, 1942; Capart, 1954, p. 842 - 843, figs. 10, 39.

*Sudanonautes (Convexonautes) aubryi aubryi*, (H. Milne-Edwards, 1853) – Bott, 1955 (part, only type from Gabon, not specimens from Zaire).


*Sudanonautes petii*, (Herklots, 1861), Cumberlidge, 1991, 1993a, b.

**Material**

Identification of *Sudanonautes aubryi* 233


**Diagnosis.** – Terminal segment of gonopod 1 robust, rounded, long ($2/3$ as long as penultimate segment), first half straight continuation of subterminal segment, second half curving outward, tapering to pointed tip, longitudinal groove present (Fig. 1f), but not visible from either cephalic or caudal views (Fig. 1d, e); subterminal segment of gonopod 1 slim (Fig. 1d - f); terminal segment of gonopod 2 extremely short (Fig. 1g). Triangular intermediate tooth on anterolateral margin between exo-orbital and epibranchial teeth (Fig. 2a - c); intermediate tooth almost as big as exorobital tooth; epibranchial tooth small. Vertical suture on flank meeting anterolateral margin at epibranchial tooth (Fig. 2a - c). Postfrontal crest always meeting anterolateral margin at a point behind the epibranchial tooth; carapace moderately arched (CH/CL = 0.52). Arthrodial membrane of cheliped scarlet.

**Description.** – **Carapace** (Fig. 2a - c). – Ovoid, widest in anterior third (CW/CL = 1.37), relatively high, with maximum height in anterior region (CH/CL = 0.52). Anterior margin of front slightly bilobed, curving under, relatively narrow, less than one-third carapace width (FW/CW = 0.29). Surface of carapace smooth with no deep grooves. Postfrontal crest spanning entire carapace, consisting of fused epigastric, postorbital crests, with notch on crest behind cornea; crest smooth in middle, slight crenulations at lateral ends, meeting anterolateral margin at a point behind the epibranchial tooth; midgroove broad, shallow. Exo-orbital tooth blunt, large, intermediate tooth almost as big as exo-orbital tooth, epibranchial tooth small, low. Anterolateral margin of carapace raised and granulated, curving inward in the hepatic region. Posterior margin about two-thirds as wide as carapace width.

Fields of conspicuous granules in suborbital regions. Each suborbital and subhepatic region with 2 sutures, 1 longitudinal, 1 vertical, dividing region into 3 parts (Fig. 2b - c). Longitudinal suture dividing suborbital, subhepatic regions from pterygostomial region, beginning medially at margin of lower orbit, curving back-
ward across subhepatic region. Vertical suture short, dividing suborbital region from subhepatic region marked by row of small rounded granules (Fig. 2b, c); suture beginning just beneath epibranchial tooth, directed forward beneath intermediate tooth, then curving down to meet longitudinal suture. First transverse groove on sternum (between sternal segments 2 and 3) complete; second groove (between sternal segments 3 and 4) consisting of 2 small notches at sides of sternum (Fig. 2d). Third maxillipeds filling entire oral field, except for transversely oval efferent respiratory openings at superior lateral corners; long, plumose flagellum on exopod of third maxilliped (Fig. 2e); ishium of third maxilliped smooth, with faint vertical groove (Fig. 2e). Mandibular palp 2-segmented; terminal segment single, undivided, fringed with hairs, longest at junction between segments (Fig. 1a - c). Segments 1 - 6 of abdomen four sided, last segment triangular, sides indented, rounded at distal margin (Fig. 2f); segment 3 broadest, segments 3 - 7 tapering inwards.

Chelipeds (Fig. 2g - j, l). - Unequal, right longer, higher than left. Palm of propodus of major cheliped of adult male swollen; dactylus, pollex long and narrow, not arched, enclosing long thin interspace along their cutting edges when fingers closed. Fingers of right cheliped with 5 larger teeth on lower digit and 5 larger teeth on upper digit, interspersed with a series of smaller pointed teeth along their lengths. Inferior margins of merus with rows of small teeth, cluster of granules surrounding larger tooth at distal end. Carpus of cheliped with 2 large pointed teeth on inner margin, second smaller than first. Left cheliped similar to right, but smaller in all respects. Walking legs 2 - 5 (pereiopods = P) slender (Fig. 2k), P4 longest, P5 shortest. Posterior margin of propodus of P2 - P5 serrated, dactyli of P2 - P5 tapering to point, each bearing rows of downward-pointing sharp bristles; dactylus of P5 shortest of the 4 legs (Fig. 2k).

Gonopods. - Terminal segment of gonopod 1 robust, rounded, long (2/3 as long as penultimate segment), first half straight continuation of subterminal segment, second half curving outward, tapering to pointed tip, faint longitudinal groove visible only from superior view (Fig. 1f). Subterminal segment of gonopod 1 slim (Fig. 1d - f), with raised flap extending halfway across segment in distal part, flap tapering diagonally to point at junction with terminal segment, forming roof of chamber for gonopod 2, subterminal segment beneath flap forming lower floor of chamber for gonopod 2 (Fig. 1d). Gonopod 2 (Fig. 1g) shorter than gonopod 1 (reaching only to junction between last 2 segments of gonopod 1). Terminal segment gonopod 2 cup-shaped, with pointed tip, extremely short, only 1/15 as long as subterminal segment. Subterminal segment gonopod 2 widest at base, then tapering sharply inward, forming long, thin, pointed, upright process which supports short terminal segment.

Adult female. - Right, left chelipeds same proportions as male of same size, unequal in both length, height. Mature female abdomen very wide reaching coxae of pereiopods 2 - 5. Segments of female abdomen 4 sided, becoming gradually distally, 1 - 5 becoming gradually wider; widest at groove separating segments 4, 5; segment 6, telson together forming near semicircle.

Growth (Fig. 3a, b, Table 1). - Carapace dimensions given in Fig. 3a, relative proportions in Fig. 3b, Table 1. Growth discussed by Enke (1972). Sexual maturity judged by development of female abdomen: abdomen of mature females overlapping bases of coxae of walking legs, pleopods broad, hair-fringed. Pubertal moult, from pubertal stage to sexual maturity, occurring between CW 45 - 50mm. Largest known specimen (male from Camerooon) CW 89.5mm. Eggs produced in
Identification of *Sudanonautes aubryi* 235

March. Dimensions of carapace varying with age (Fig. 3a). Width of carapace (in relation to carapace length, CW/CL) not changing with age: CW/CL of juvenile and pubescent animals not significantly different ($P > 0.05$) from that of adults (Fig. 3b). Height of carapace (CH/CL) increasing with age: that of adult *S. aubryi* significantly higher ($P < 0.001$) than CH/CL of juvenile and pubescent animals. Width of frontal margin (FW/CL) decreasing with age: that of juvenile and pubescent animals significantly wider ($P < 0.001$) than that of adults (Fig. 3b).

**Distribution.** - Cote d'Ivoire, Ghana, Togo, Benin, Nigeria, Cameroon, Gabon. It is likely that *S. aubryi* is also present in Equatorial Guinea. BOTT (1955) and MONOD (1977, 1980) report *S. aubryi* from Togo to Zaire. The range of this species has been extended here westwards to include Cote d'Ivoire and Ghana, but there are no confirmed records of this species in the Republic of the Congo or in Zaire.

**Colour.** - (Living adults from Gwarzo, Nigeria): Dorsal carapace green-brown; postfrontal crest white-cream; flanks light green; eyestalks brown, cornea scarlet red; epistome brown orange “burnt” colour; edges of orbits and frontal margin white-cream; sternum and abdomen white-cream; arthrodial membranes between joints of chelipeds and pereiopods scarlet; dorsal surface of chelipeds and pereiopods dark green, ventral surface white-cream; ovigerous female with orange eggs. Specimens from Owo, Nigeria varied as follows: postfrontal crest green brown; flanks light brown becoming purple on lower margins; eyestalks brown, corneas black; abdomen, sternum, underside of legs, and chelipeds, white-cream with pink-mauve wash.

**Variation.** - The height of the carapace (in relation to the carapace length) increases as crabs grow (Fig. 3b), and also varies with habitat. Thus, specimens from the rain forest regions (southern Nigeria, southern Cameroon and Gabon) have flatter carapaces than those from the savanna regions (Ghana, Togo, northern Nigeria, and northern Cameroon). Distinct patches of granulations on the flanks in the suborbital region are present in some specimens (Nigeria, Efora, Ghana) while others (Bitye, Cameroon) have almost smooth flanks. The postfrontal crest is wavy in some specimens (Ja river, Bitye, Cameroon) and straight in others (Kribi river, Cameroon); the postfrontal crest is granulated in some specimens (Obubra district, Nigeria) and smooth in others (Ja river, Bitye, Cameroon); the postfrontal crest behind the intermediate tooth has a distinct notch in some specimens (Cote d'Ivoire, southern Nigeria, Edea, Cameroon) and is straight in others (Bitye, Kribi, Cameroon). The inner margin of the merus of the cheliped has granules on both edges (Ibadan, Nigeria) or on one edge only (Bitye, Cameroon). The specimen from Kribi River, Cameroon has only faint granules on the anterolateral margin, and the end of the anterolateral margin does not turn inward over the carapace in the hepatic region.

**Ecology.** - *Sudanonautes aubryi* is found in guinea and woodland savanna from Cote d'Ivoire to northern Cameroon, and in tropical rain forest from southeast Nigeria to Gabon. This large species inhabits streams, rivers, and ponds, and digs burrows near waterways. *Sudanonautes aubryi* is capable of breathing air, and is often found on land at night. The habitat of *S. aubryi* in wooded savanna fringing a forested area in Cote d'Ivoire has been described by BERTRAND (1974).
The present findings represent a return to the original concept of *S. aubryi* proposed by earlier workers (H. Milne-Edwards, 1853; A. Milne-Edwards, 1887; de Man, 1901) who based their descriptions on the types of *S. aubryi* from Gabon. The difficulties in distinguishing between *S. aubryi* and *S. floweri* date back to the work of Rathbun (1904, 1905), in which specimens of *S. floweri* were substituted and described as *S. aubryi*.

Specimens from Cabinda (MNHN B5048) and Zaire (MNHN B5049) used by Rathbun (1905) to describe *S. aubryi* have been examined in the present study and found to be *S. floweri*. This opinion is supported by the photographs of the specimens from Zaire and Gabon provided by Rathbun (1904, TVI, plate IX, figs. 5, 8) which closely resemble *S. floweri*, and which are clearly different from the photograph of the female type of *S. aubryi* (Rathbun, 1904, TVI, plate IX, fig. 3).

Unfortunately, Rathbun’s (1905) opinions were accepted by later workers with the result that the descriptions of *S. aubryi* in Balss (1914a, 1929), Capart (1954), Bott (1955), and Monod (1977, 1980) all refer to *S. floweri*, rather than to *S. aubryi* sensu H. Milne-Edwards (1853). For example, it is likely that Capart’s (1954) description of *Potamonautes aubryi* is actually *S. floweri*, since it is based on the same specimen from Cabinda (MNHN B5048), used by Rathbun (1904, 1905). Similarly, the description of *S. (C.) a. aubryi* in Bott (1955: 304 - 305, figs. 65, 100, pl. XXVIII, figs. 2 a - d) is based on specimens of *S. floweri* from Zaire. Finally, the descriptions of *S. (C.) a. aubryi* in Monod (1977, 1980) probably also refer to *S. floweri*, since that author accepted the taxonomic opinions of Bott (1955).

*Sudanonautes aubryi* sensu Bott (1955) was designated the type species of the subgenus *Convexonautes* Bott, 1955, and assigned two subspecies, *S. (C.) a. floweri*, and *S. (C.) a. monodi*. Comparison of the types of *Thelphusa aubryi* from Gabon, *Potamon (Potamonautes) floweri* from Sudan, and *Potamonautes aubryi monodi* from Cameroon in the present study indicates that these three taxa are all valid species. The present concept of *S. aubryi* creates inconsistencies in the use of the subgenera *Sudanonautes* Bott, 1955 and *Convexonautes*, and these categories are not recognised here.

Bott’s (1955, 1964) works contributed further to the taxonomic confusion surrounding *S. aubryi* with his opinions concerning five other taxa. For example, *S. (S.) d. decazei* in Bott (1955) was assigned three synonyms: *P. (P.) pobeguini*, *P. (P.) regnieri*, and *P. decazei granulata*. Later, Bott (1964) considered *S (S.) d. decazei* to be a junior synonym of *S. (S.)
Identification of *Sudanonautes aubryi* 237

Examination of the types of these five taxa in the present study indicates that *T. pelii*, *T. decazei*, and *P. (P.) pobeguini* are all synonyms of *S. aubryi*, but that *Potamon d. granulata* and *Potamon (P.) regnieri* are not. *Potamon d. granulata* was recently redescribed as *S. granulatus* by CUMBERLIDGE (1993a). The female type of *P. (P.) regnieri* lacks an intermediate tooth between the exo-orbital and epibranchial teeth, and so does not belong to *Sudanonautes*; most probably it is a species of *Potamonautes* MacLeay, 1838.

Because of the taxonomic difficulties outlined above, specimens belonging to all four species of freshwater crab that host the human lung fluke (*Paragonimus*) in Nigeria and Central Africa have been wrongly identified in the literature. For example, VOELKER, Sachs, Volkmer & Braband (1975, fig. 6) misidentified *S. aubryi* (as *S. africanus*) and *S. floweri* (as *S. aubryi*), while Voelker & Sachs (1977) misidentified *S. africanus* (as *S. aubryi*, fig. 1), *S. granulatus* (as *S. pelii*, fig. 3), and *S. floweri* (as *S. aubryi*, fig. 4).

**Comparisons**

*Sudanonautes floweri*, *S. africanus*, and *S. granulatus* are all sympatric with *S. aubryi*, and are all second intermediate hosts of *Paragonimus* in Nigeria and Central Africa. *Sudanonautes aubryi* can be distinguished from *S. floweri* by examination of the terminal segment of gonopod 1: that of *S. floweri* has a raised cephalic lobe, and a distinct longitudinal groove in the caudal view, while that of *S. aubryi* lacks these features (Fig. 1d). In addition, the outer margin of the subterminal segment of gonopod 1 of *S. floweri* is conspicuously broadened, while that of *S. aubryi* is slim (Fig. 1d, e). The sternum of *S. floweri* has raised ridges at the points where the chelipeds insert, while *S. aubryi* lacks these sternal ridges. The carapace of *S. floweri* is significantly (P < 0.001) higher (CH/CL *S. floweri* = 0.61, *S. aubryi* = 0.52), and wider (CW/CL *S. floweri* = 1.51, *S. aubryi* = 1.37) than that of *S. aubryi* (Table 1). Finally, the carapace and postfrontal crest of *S. floweri* are uniformly red brown with a contrasting yellow postfrontal crest, while these features are green brown in *S. aubryi*.

*Sudanonautes aubryi* can be distinguished from *S. africanus* by examination of the terminal segment of gonopod 1: that of *S. africanus* is thin and needle-like, while that of *S. aubryi* (Fig. 1d, e) is fatter and more curved. The carapace of *S. africanus* is significantly flatter (P < 0.001) than that of *S. aubryi* (CH/CL *S. africanus* = 0.43, *S. aubryi* = 0.52, Table 1). The postfrontal crest of *S. africanus* meets the anterolateral margin at, and not behind, the epibranchial tooth, and the carapace of
S. africanus has patches of raised warts, while that of S. aubryi is completely smooth. Finally, the proximal region of the pollex of the propodus of the major cheliped of S. africanus has a large, flattened, fused tooth, which is lacking in S. aubryi.

Sudanonautes aubryi can be distinguished from S. granulatus by examination of the terminal segment of gonopod 1: that of S. granulatus has a raised cephalic lobe, and a distinct longitudinal groove in the caudal view, while that of S. aubryi lacks these features (Fig. 1d). The carapace of S. granulatus is significantly (P < 0.001) wider than that of S. aubryi (CW/CL S. granulatus = 1.41, S. aubryi = 1.37, Table 1). Finally, the chelipeds of S. granulatus are brick red-yellow, and the arthrodial membranes are brown yellow, while the chelipeds of S. aubryi are green brown, and the arthrodial membranes crimson (CUMBERLIDGE, 1993a).

Sudanonautes aubryi can be distinguished from S. monodi by examination of the terminal segment of gonopod 1: that of S. monodi has a raised cephalic lobe, and a distinct longitudinal groove in the caudal view (CUMBERLIDGE, 1991), while that of S. aubryi lacks these features (Fig. 1d, e). The carapace of S. monodi is significantly (P < 0.001) higher (CH/CL S. monodi = 0.58, S. aubryi = 0.52) and wider (CW/CL S. monodi = 1.49, S. aubryi = 1.37) than that of S. aubryi (Table 1). Finally, the carapace and postfrontal crest of S. monodi are uniformly red brown with a contrasting yellow postfrontal crest, while the carapace and postfrontal crest of S. aubryi are green brown.

Summary

The freshwater crab Sudanonautes aubryi, one of the second intermediate hosts of the human lung fluke (Paragonimus) in Nigeria and Central Africa, is redescribed from type material and a large series of other specimens. Sudanonautes aubryi is recognised by a combination of characters of gonopod 1, and of the carapace. Three taxa (S. pelii, S. decazei, and P. (P.) pobeguini) are judged to be junior synonyms of S. aubryi. Sudanonautes aubryi is distinguished from similar species, including other freshwater crab hosts of Paragonimus. Two former subspecies of S. aubryi (S. floweri and S. monodi) are considered to be good species, and the subgenera Sudanonautes and Convexonautes are not recognised. The distribution of S. aubryi is revised to include guinea and woodland savanna from Cote d'Ivoire to northern Cameroon, and tropical rain forest from south-east Nigeria to Gabon; Congo and Zaire are excluded.

Zusammenfassung

Es wird eine Neubeschreibung der Süßwasserkrabbe Sudanonautes aubryi, einer der zweithäufigsten Zwischenwirte des menschlichen Lungenwurms Paragonimus in Nigeria und Zentralafrika, gegeben. Sudanonautes aubryi ist zu erken-
Identification of *Sudanonautes aubryi*


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**References**


Identification of *Sudamonautes aubryi*


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