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THE STATUS OF THE CALLIANASSID GENUS *CALLICHIRUS* STIMPSON, 1866 (CRUSTACEA: DECAPODA: THALASSINIDEA)

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Abstract.—The callianassid genus *Callichirus* Stimpson is redefined and restricted to its type species, *Callianassa major* Say, 1818, and three other species.

The callianassid genus *Callichirus* was established by Stimpson (1866:47) with *Callianassa major* Say, 1818, from the southeastern United States, as its type species. Since then, *Callichirus* has been treated in various ways, including: (1) as a subgenus of *Callianassa* Leach, 1814 (e.g., by Borradaile 1903; De Man 1928a, b; Schmitt 1935; Rodrigues 1971); (2) as a distinct genus, comprising numerous species formerly assigned to *Callianassa* (e.g., by de Saint Laurent 1974, Le Loeuff and Intès 1974, De Saint Laurent and Le Loeuff 1979); or (3), as a synonym of *Callianassa* (e.g., by Biffar 1971, Poore and Griffin 1979). We disagree with all of these interpretations for reasons discussed below, and we give here characters that distinguish *Callichirus* from all other genera of the Callianassidae.

Part of the problem has been that most authors, at least up to de Man (1928a:30), had seen *no* material of *Callianassa major,* and that until very recently the only available illustrations of the species were photographs (Hay and Shore 1918:pl. 29, fig. 10; De Man 1928a:fig. 14c, d). De Man had examined and figured two chelipeds (1928a: fig. 14–14b), but had studied no complete specimens. The species was not well figured until specimens from Brazil were studied by S. A. Rodrigues (1971:192, figs. 1–20).

In his original account of *Callichirus,* Stimpson (1866:47) noted that the cheliped was elongate ("carpus and hand of the greater cheliped very long"), that the uropodal endopod was narrow ("very narrow, almost styliform"), and that the telson was short and broad, with a posterior emargination. We suggest that these features and the distinctive ornamentation of the third to fifth abdominal somites (Figs. 1f, 2e, 3e) are diagnostic for the genus *Callichirus,* and will serve to distinguish its members from all other callianassids.

De Saint Laurent (1974:513) divided the family Callianassidae into two subfamilies, the Callianideinae and the Callianassinae. She assigned eight genera, including *Callichirus* Stimpson, 1866, to the Callianassinae. Refinement of diagnoses for most of these genera was attempted later by Le Loeuff and Intès (1974) and by de Saint Laurent and Le Loeuff (1979).

However, not all of the genera recognized by de Saint Laurent have been accepted by other workers. Poore (1975:205) commented on the limitations of de Saint Laurent's genera, and Poore and Griffin (1979:245) noted, "We have had some difficulty in placing some of the Australian callianassid species in the new genera erected by Saint Laurent (1973) . . . and therefore prefer not to follow her arrangement. The exception is her new genus *Gourretia* which forms a relatively homogeneous group of species clearly distinct from the remainder of the family." Rabalais, Holt, and Flint (1981:98) abandoned use of de Saint Laurent's genera because "the distinctions proposed . . . were not clear cut for Western Hemisphere callianassids." Williams (1984:180) commented, "According to de Saint Laurent, the

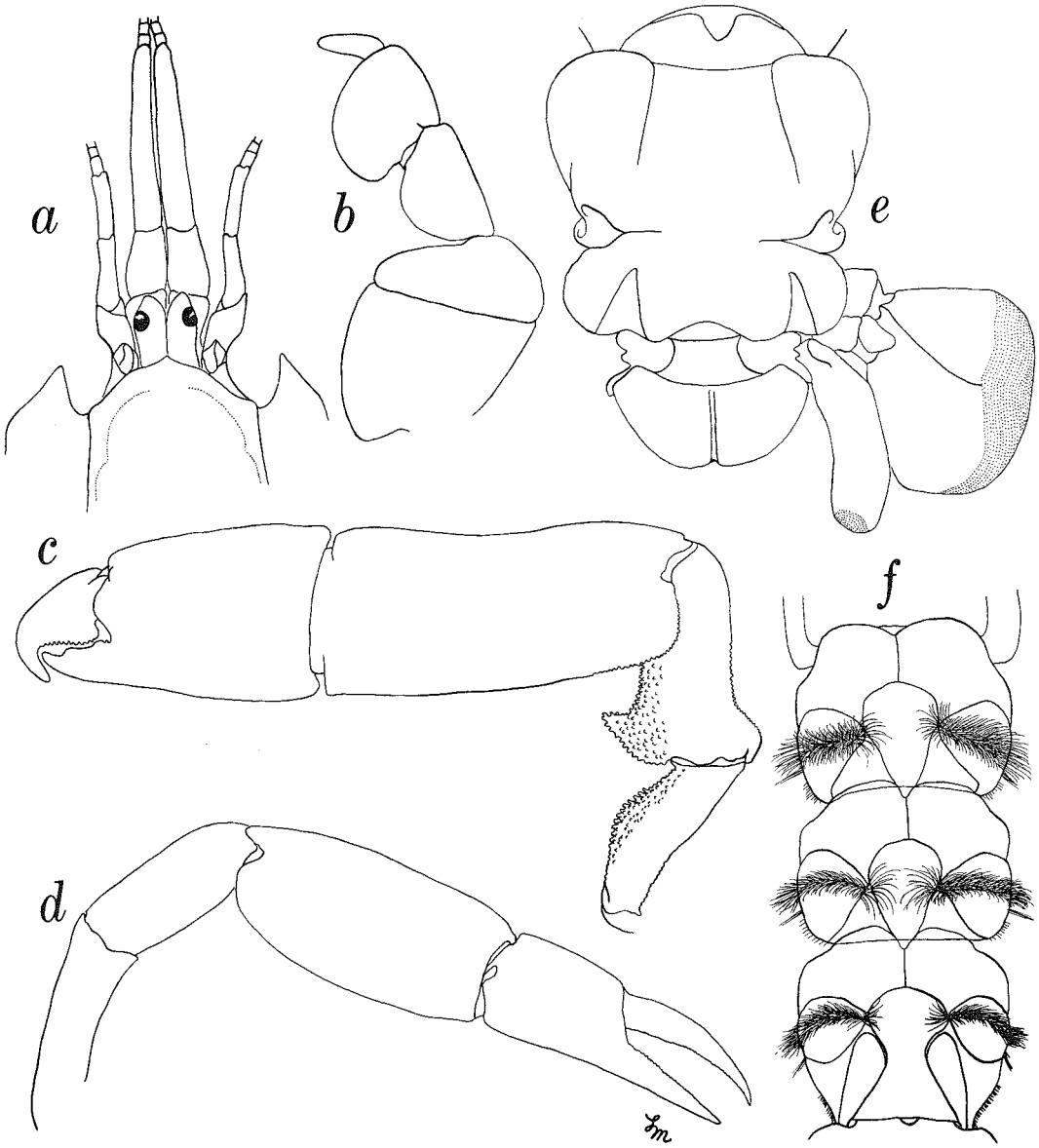

Fig. 1. *Callichirus major* (Say), male, tl 77 mm, Indian River, Florida (USNM 228086): a, Front; b, Third maxilliped; c, Major cheliped; d, Minor cheliped; e, Sixth abdominal somite, telson, and uropod (stippled areas on uropod show areas of dense setation). Male, tl 56 mm, Indian River, Florida (USNM 228087): f, Third to fifth abdominal somites (top is anterior).

known species from the western Atlantic formerly placed in *Callianassa* belong in *Callichirus*. The differences between *Callianassa* and *Callichirus* depend upon mouthparts and seem somewhat overlapping. For the time being, therefore, I am retaining the well-known name *Callianassa* for these species, awaiting further research which may place de Saint Laurent's system on a firmer basis."

We redefine *Callichirus*, as follows:

Genus *Callichirus* Stimpson, 1866

Callichirus Stimpson, 1866:47.

Definition.—Ocular peduncles elongate, either in precorneal region or as postcorneal spine. Major chela of adult male greatly enlarged, with 3 distal segments equal to 2 or more times middorsal carapace length. Third to fifth abdominal somites with distinctive ornamentation, visible dorsally, each somite with midlateral patch of setae. Telson much shorter than uropods, much wider than long, with medial emargination. Uropodal endopods strap-shaped, very slender, 2.5 to 4 times longer than wide, with setae most concentrated in apical patch.

Type species.—*Callianassa major* Say, 1818, by original designation and monotypy.

Included species.—Four, as follows:

1. *Callichirus major* (Say, 1818:238) (Fig. 1), from the southeastern United States, Gulf of Mexico, and Brazil.
2. *Callichirus islagrande* (Schmitt, 1935: 5) (Fig. 2), from the northern and western Gulf of Mexico.
3. *Callichirus seilacheri* (Bott, 1955:47) (Fig. 3), from El Salvador.
4. *Callichirus adamas* (Kensley, 1974: 266), from West Africa and South Africa.

Remarks.—We believe that these four species comprise a distinctive group of species within the Callianassidae recognizable as a distinct genus, *Callichirus*. The ornamentation of the third to fifth abdominal somites alone will distinguish these species from all other species assigned to *Callianassa* or other genera of the Callianassidae.

Preliminary anatomical studies of the third to fifth abdominal somites suggest that the dorsal sculpture and setation may comprise the exoskeletal components of an abdominal glandular apparatus, perhaps related to cementing of burrow walls. If so, this apparatus would represent a unique anatomical specialization among the thalassinideans. A previous study (Thompson 1972) has demonstrated that cement production is centered in a hindgut gland in *Upogebia pugettensis* (Dana) and in glands at the bases of mouthparts in *Callianassa californiensis* Dana. Additional histological studies are planned to resolve the function of these abdominal glands in *Callichirus*.

Our corrected definition of *Callichirus* also is corroborated in part by recent ecological and physiological studies. Osmoregulatory capacities and habitat preferences in *C. major* and *C. islagrande* are very similar; neither species can osmoregulate and both can tolerate limited reductions in salinity (Felder 1978). This is in striking contrast to the case in *Callianassa jamaicensis* Schmitt and *Callianassa kraussi* Stebbing, both of which are euryhaline, hyperosmotically regulate at and tolerate low salinities, withstand abrupt changes of salinity, and show marked regulation of volume (Forbes 1974, Felder 1978). But the four above species were treated as congeneric in the broadly defined *Callichirus* of de Saint Laurent and Le Loeuff (1979). In fact, the tendency for osmoconformation and limited tolerance of reduced salinity, characteristic of *Callichirus major* and *Callichirus islagrande*, bears the greatest similarity to those features in *Callianassa californiensis*, *Callianassa filholi* A. Milne Edwards, and *Callianassa affinis* Holmes (see Gross 1957, Thompson and Pritchard 1969), Felder 1978), none of which

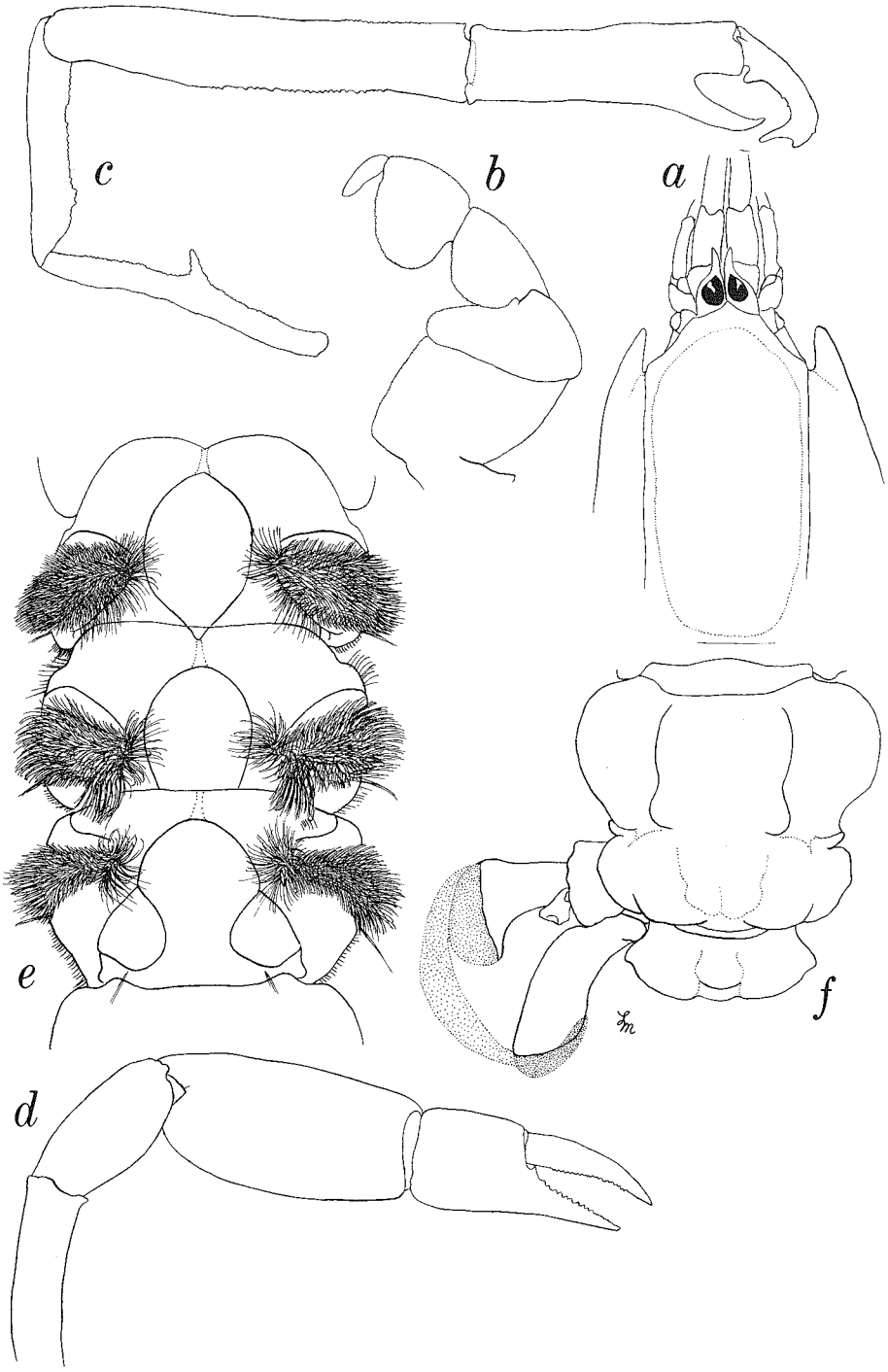

Fig. 2. *Callichirus islagrande* (Schmitt), male holotype, TL 87 mm, Grand Isle, Louisiana (USNM 69369): a, Front; b, Third maxilliped; c, Major cheliped; d, Minor cheliped; e, Third to fifth abdominal somites (top is anterior); f, Sixth abdominal somite, telson, and uropod (stippled areas on uropod show areas of dense setation).

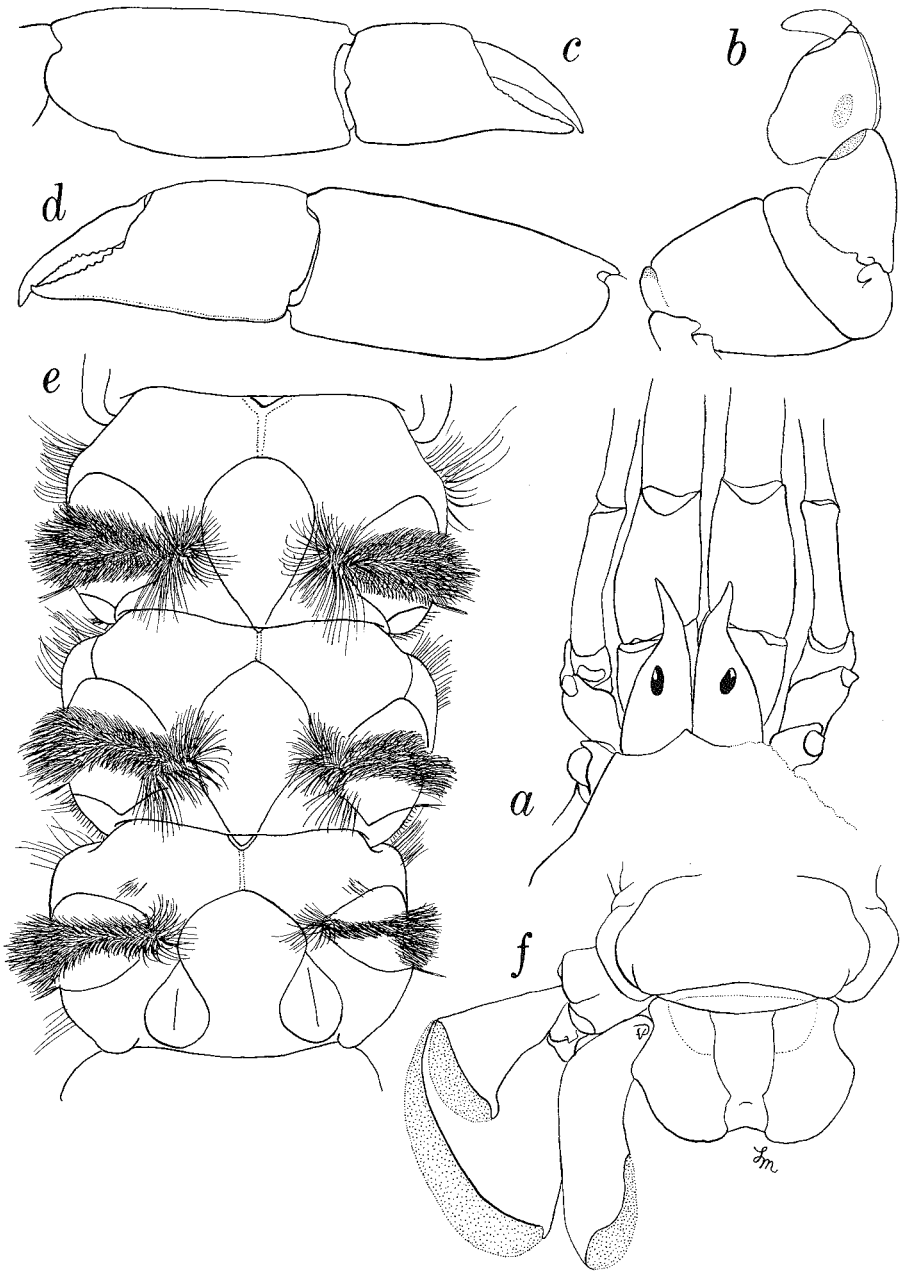

Fig. 3. *Callichirus seilacheri* (Bott), male holotype, tl 85 mm, Los Blancos, El Salvador (Forschungsinstitut Senckenberg no. 2184): a, Front; b, Third maxilliped; c, Right first cheliped; d, Left first cheliped; e, Third to fifth abdominal segments (top is anterior); f, Sixth abdominal segment, telson, and uropod (stippled areas on uropod show areas of dense setation). Note that both first chelipeds are of minor form.

is assignable to *Callichirus.* We believe that this evidence from the physiology of these organisms suggests an artificial and heterogeneous grouping within *Callichirus* sensu de Saint Laurent and Le Loeuff (1979).

We provide here original sketches (Figs. 1–3) of three of the species that we assign to *Callichirus.* We have not seen material of *Callichirus adamas,* but the accounts and figures of this species provided by Kensley (1974:266, figs. 1, 2), who first pointed out the resemblance between *C. adamas, C. major,* and *C. islagrande,* and by de Saint Laurent and Le Loeuff (1979:67, figs. 14f, 16a, 17a, 19f, 20e–g, 23f–i), clearly identify *C. adamas* as a member of *Callichirus.* The characteristic ornamentation of the abdomen in *C. adamas* is clearly shown by de Saint Laurent and Le Loeuff (1979) in their figure 17a.

Of the species assigned to or described in *Callichirus* by Le Loeuff and Intès (1974) and de Saint Laurent and Le Loeuff (1979), only those four listed above can be assigned to *Callichirus* sensu stricto. We consider all of the other species assigned to *Callichirus* by those authors to be members of *Callianassa.*

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