

***Cambarus (Puncticambarus) hobbsorum*, a new crayfish
(Decapoda: Cambaridae) from North Carolina**

John E. Cooper

North Carolina State Museum of Natural Sciences, Research Lab, 4301 Reedy Creek Road,
Raleigh, North Carolina 27607, U.S.A.

Abstract.—*Cambarus (Puncticambarus) hobbsorum* is a new species of crayfish that occurs in parts of the Cape Fear and Yadkin-Pee Dee river basins of North Carolina. It differs from all other members of the subgenus in having a narrow areola; long, plumose setae on much of the opposable surface of the fixed finger of the chela of the cheliped in adults as well as juveniles; and a pronounced, disklike caudal knob on the gonopod of the form I male. These characters contradict some aspects of the diagnosis of the subgenus *Puncticambarus*, which is emended to accommodate *C. hobbsorum*.

The crayfish whose description follows is one of a number of undescribed species that for over a century have been indiscriminately subsumed under the name *Cambarus (Puncticambarus) acuminatus* Faxon, 1884. This melange inhabits most of the river basins in the Coastal Plain and Piedmont Plateau of the mid-Atlantic versant, ranging from the Patapsco River in Maryland to the Saluda River in South Carolina. Three decades ago Hobbs (1969:135) said, "It is almost certain that two, and possibly, three distinct species are presently assigned to *Cambarus acuminatus*," and that this name very likely applied only to the "typical form" of the upper Saluda River basin. The confused state of this complex led Hobbs & Peters (1977) to refer to the North Carolina populations as *Cambarus (Puncticambarus) sp. C*, a designation later adopted by Cooper & Braswell (1995:88). Although in his final checklist of the American crayfishes Hobbs (1989:25) applied the name *C. (P.) acuminatus* to all of the Atlantic versant populations, he reiterated his earlier opinion, saying, "This highly variable species is also in need of attention."

I have undertaken an analysis of the "*C. (P.) acuminatus* complex," and the results to date show that Hobbs' opinion anent spe-

ciation in this group of crayfishes was not only characteristically astute, but may have been somewhat conservative. The still incomplete analysis has revealed four unique variants, two of which are so distinctive they can now be reported as new species without awaiting the final results of the study. The description of one of the two follows, and the description of the other is in progress.

The new species described below displays primary characters that contradict several aspects of the existing diagnoses of the subgenus *Puncticambarus* (Hobbs 1969:101, 1981:227). Nevertheless, since other characteristics of the species are more like those of a *Puncticambarus* than those of any other extant subgenus, I have at this time opted to take the conservative approach of emending *Puncticambarus* to accommodate the new species rather than introducing a new, monotypic subgenus.

Other members of the "*acuminatus* complex" are found in some of the same areas where the new species occurs. Thus, it is impossible to determine which, if any, published references to *C. (P.) acuminatus* might refer to the new species, and no synonymy can be presented.

Abbreviations used in the text are as fol-

lows: j, juvenile; NC, North Carolina State Highway; NCSM, North Carolina State Museum of Natural Sciences, Raleigh; PCL, postorbital carapace length; R, river; SR, State secondary road (formerly county road); TCL, total carapace length; US, United States highway; USGS, United States Geological Survey; USNM, National Museum of Natural History, Smithsonian Institution, Washington, D.C.; and UTM, Universal Transverse Mercator coordinates.

The diagnosis of the subgenus *Puncticambarus* requires the following modifications:

Puncticambarus Hobbs, 1969, emended

Areola 1.9 to 10.8 times as long as broad and comprising 29.4 to 40.0% of TCL and 39.2 to 49.2% of PCL, bearing many or few, shallow or deep, punctations. Opposable (mesial) margin of fixed finger of chela of adults sometimes bearing conspicuous tufts of plumose setae. Gonopod (first pleopod) of form I male sometimes with strong, disklike caudal knob at caudoproximal base of central projection.

Cambarus (*Puncticambarus*) *hobbsorum*,
new species

Fig. 1, Table 1

Diagnosis.—Body and eyes pigmented, eye large (\bar{X} adult diam 2.0 mm). Rostrum acuminate, often caret-shaped, lacking median carina; margins strongly to moderately converging to base of acumen, which is not delimited by marginal spines or tubercles; margins not strongly constricted at base of acumen, but sometimes more tapering from there to apical tubercle; rostrum longitudinally excavate, floor (dorsal surface) of cephalic half to three-fourths usually plane and with few punctations; acumen comprising 25.0 to 49.0% ($\bar{X} = 39.1\%$, $n = 61$) of rostrum length, latter constituting 17.3 to 25.0% ($\bar{X} = 20.5\%$, $n = 65$) of TCL. Areola 4.2 to 10.8 ($\bar{X} = 6.1$, $n = 70$) times as long as broad, comprising 33.9 to 39.8% ($\bar{X} = 36.4\%$, $n = 70$) of TCL and 42.5 to 49.2%

($\bar{X} = 44.8\%$, $n = 76$) of PCL, with large punctations, usually 3 or 4 across narrowest part. Carapace dorsoventrally depressed; thoracic section dorsally punctate, dorsolaterally granulate, and laterally cobbled with large, rounded tubercles; cephalic section laterally covered with moderate to large tubercles; hepatic spines absent, but tubercles in region sometimes subspiniform; branchiostegal spine reduced to small tubercle or obsolete. Single cervical spine or large, spiniform tubercle present on each side of carapace, other smaller tubercles dorsal to it. Suborbital angle subacute or obtuse, with tubercle or spine. Cephalic margin of postorbital ridge with spine or tubercle. Antennal scale 2.3 to 3.1 ($\bar{X} = 2.7$, $n = 61$) times as long as broad, widest distal to midlength; lateral margin thickened, terminating distally in long, acute spine; antennal peduncle with strong to moderate distolateral spine on basis, strong or weak distoventral tubercle on ischium. Pleura of abdomen usually with subtruncate ventral margins, subangular caudoventral corners, and subrectilinear caudal margins.

Palm of chela inflated, 1.5 to 1.9 ($\bar{X} = 1.7$, $n = 60$) times wider than deep, width 1.3 to 1.7 ($\bar{X} = 1.5$, $n = 60$) times length of mesial margin; mesial half of dorsal surface, and part of lateral half, often with small squamous tubercles; distolateral margin costate for short distance, with slight impression and aggregation of large punctations; mesial margin of palm with 2 rows of tubercles, and often others; mesial row of 6 to 10 (usually 7 to 9) tubercles, subtended dorsally by row of 3 to 11 (usually 5 to 8) somewhat smaller tubercles. Fixed finger of cheliped with strong to moderate longitudinal ridge on dorsal surface, weaker ridge on ventral surface; dorsolateral margin costate (continuous with palmar costa) and with moderate proximal impression; opposable surface of finger bearing tufts of long, plumose setae along proximal fourth to three-fourths of length, and row of 4 to 13 (usually 6 to 9) tubercles in addition to usual subconical tubercle ventral to denti-

cles, third or fourth tubercle from base of finger larger than others. Dactyl of cheliped with weak to moderate longitudinal ridges on dorsal and ventral surfaces; mesial surface of finger with strong tubercles on proximal three-fourths, basal ones in 2 or 3 rows, encroaching dorsally; opposable surface bearing 7 to 13 tubercles, fourth (rarely fifth) tubercle from base offset ventrally; length of dactyl 1.7 to 2.3 ($\bar{X} = 1.9$, $n = 60$) times length of mesial margin of palm.

Hook on ischium of third pereopod of males, that of form I male (Fig. 11) overreaching basioischial articulation by half or more of length, opposed by tubercle on basis. Gonopods (first pleopods) of form I male (based on holotypic male; Fig. 1B, C, G) symmetrical in caudal aspect, total length 22.7% of TCL; proximomesial apophyses large, lacking spiniform spur, bases slightly separated; gonopod in lateral aspect with prominent, disklike caudal knob at caudoproximal base of central projection, distal part of mesial surface of knob separated from shaft by deep cleft; central projection corneous, not tapered, curved slightly greater than 90° from axis of shaft and directed caudally; tip not reaching level of distal margin of mesial process or extending as far caudally as tip of latter; subapical notch strong, directed caudoproximally; mesial process inflated, directed caudoproximally and inclined caudolaterally, tapering to subacute distal terminus, which with 2 minuscule "spines"; in distal aspect, caudal end of central projection curving slightly caudomesially, mesial process directed caudolaterally, and caudal knob distinct.

Annulus ventralis (based on allotypic female; Fig. 1K) symmetrical, basically spindle-shaped in ventral outline, about twice as wide as long; caudal two-thirds heavy, walls thick, cephalic third depressed, membranous; cephalic margin with cephalomedian convexity, flanked each side by broad, shallow concavity; cephalomedian trough extremely narrow near cephalic margin, dissecting margin in midline, widening short distance caudal to margin and flanked

each side by strong, relatively wide ridge; dextral ridge terminating caudally at base of transverse tongue, sinistral ridge joining upper arm of reverse C-shaped caudosinistral wall; tongue originating dextral to caudal midline, directed cephalosinistrally for short distance, then abruptly and obliquely turning caudosinistrally before plunging into deep fossa beneath sinistral wall. (Mirror image of this configuration occurs just as often as that described.)

Measurements (mm) of type specimens provided in Table 1.

Description of holotypic male, form I.—Body and eyes pigmented, eye 2.2 mm in diameter. Cephalothorax (Fig. 1A, D) subcylindrical; thoracic section of carapace dorsoventrally depressed (maximum width 1.6 times depth), dorsally punctate, dorso-laterally granulate, laterally cobbled with large, rounded tubercles, each with pair of short setae at cephalic margin; cephalic section of carapace covered laterally with large tubercles, gastric region with some scattered punctations. Areola 7.9 times as long as wide, constituting 38.4% of TCL (45.8% of PCL), with large punctations, 3 across narrowest part. Rostrum acarinate, acuminate, with elevated margins converging to base of acumen, then somewhat more strongly converging and concave to acute, corneous, cephalodorsally directed apex, tip of which extending to distal margin of penultimate podomere of antennular peduncle; rostrum without marginal spines or tubercles, margins flanked mesially by continuous row of setiferous punctations; acumen comprising 41.3% of rostrum length, latter constituting 19.0% of TCL; floor (dorsal surface) of rostrum moderately excavate longitudinally, subconcave, with punctations on caudal half only; subrostral ridge moderately developed, visible to base of acumen in dorsal aspect. Postorbital ridge strong, dorsolaterally grooved, cephalic margin with minuscule tubercle. Suborbital angle obtuse, with small tubercle; branchiostegal spine small, tuberculiform. Cervical spine area with 1 small spine and 1

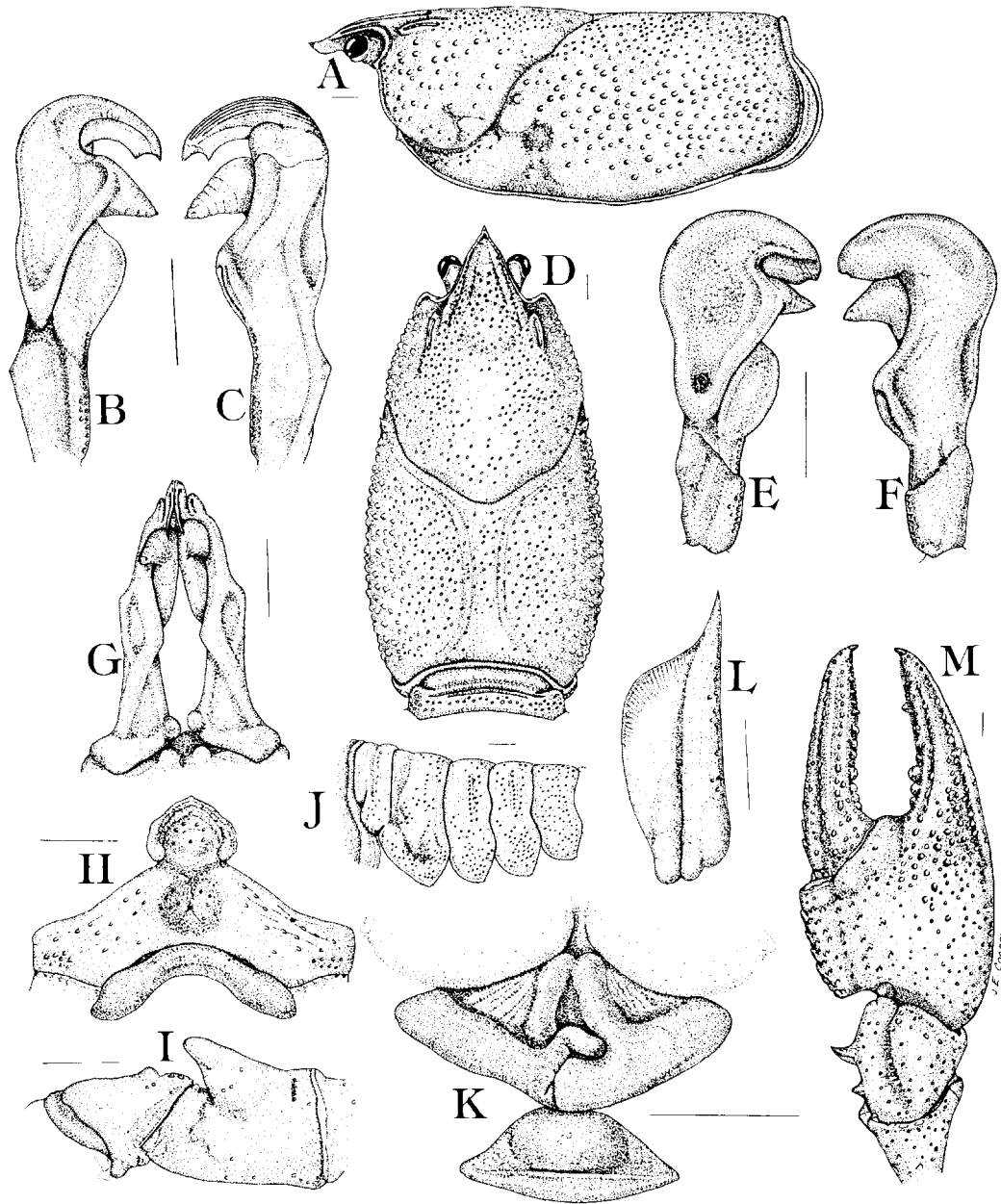


Fig. 1. *Cambarus (Puncticambarus) hobbsorum*, new species; all from holotypic male, form I (NCSM 5319), except E, F, from morphotypic male, form II (NCSM 5321), and K, from allotypic female (NCSM 5320): A, lateral aspect of carapace; B, E, mesial aspect of gonopod (first pleopod); C, F, lateral aspect of gonopod; D, dorsal aspect of carapace; G, caudal aspect of in situ gonopods; H, epistome; I, basis and ischium of third pereopod, showing hook and opposing tubercle; J, lateral aspect of abdomen; K, annulus ventralis and postannular sclerite; L, antennal scale; M, dorsal aspect of distal podomeres of right cheliped. Setae not illustrated. Line = 2 mm.

Table 1.—Measurements (mm) of types of *Cambarus* (*Puncticambarus*) *hobbsorum*, new species.

	Holotypic male, form I	Allotypic female	Morpho- typic male, form II
Carapace			
Total length	33.1	31.6	27.4
Postorbital length	27.7	25.4	22.5
Length cephalic section	20.4	20.1	17.3
Width	17.8	16.5	14.9
Depth	11.2	11.7	7.1
Length rostrum	6.3	7.1	5.4
Length acumen	2.6	3.2	2.2
Length areola	12.7	11.5	10.1
Width areola	1.6	2.2	1.3
Antennal scale			
Length	5.5	6.1	5.4
Width	2.1	2.2	2.0
Abdomen			
Length	32.6	31.0	27.2
Width	15.3	14.9	12.7
Cheliped			
Length lateral margin chela	31.6	24.2	21.6
Length mesial margin palm	9.8	7.3	6.8
Width palm	15.8	11.3	10.1
Depth palm	8.9	6.8	6.3
Length dactyl	19.5	14.8	12.7
Length carpus	11.4	9.4	8.1
Width carpus	9.0	7.5	6.7
Length dorsal margin merus	12.3	11.1	9.8
Depth merus	8.8	7.5	6.6
Gonopod length	7.5	N/A	6.5

tubercle each side of carapace; cervical groove uninterrupted, ventral margin of cephalic portion with row of small tubercles.

Antennal peduncle with short distolateral spine on basis (absent from right peduncle), and small, rounded tubercle on ventral surface of ischium; tip of adpressed antennal flagellum reaching just beyond cephalic margin of telson; antennular peduncle with small median spine situated just distal to midlength of ventral surface of basal podomere. Antennal scale (Fig. 1L) 2.6 times as long as wide, broadest distal to midlength; lateral margin thickened and terminating in long distal spine, tip of which

reaching midlength of ultimate podomere of antennular peduncle; lamella approximately 1.6 times as wide as thickened lateral portion, distal margin moderately declivous to widest point, mesial margin somewhat rounded distally, subparallel to lateral margin for most of length.

Abdomen slightly shorter than carapace, latter wider than greatest width of abdomen; pleura of abdomen (Fig. 1J) with slightly rounded ventral margins, subangular caudoventral corners, and rectilinear caudal margins; terga quite punctate, except articular surfaces glabrous. Proximal podomere of uropod with very small caudolateral spine on lateral lobe, larger caudomedian spine on mesial lobe; mesial ramus of uropod with moderate caudolateral spine, and strong median ridge ending in small, subterminal caudomedian spine; lateral ramus with broad median ridge on cephalic section; transverse flexure on right ramus bearing row of 14 fixed spines (16 on left) and 1 large, articulated sublateral spine. Telson with 2 spines each caudolateral corner of cephalic section, mesialmost of which articulated; transverse flexure of telson moderately strong, caudal margin rounded.

Epistome (Fig. 1H) with subcordiform cephalic lobe bearing weak cephalomedian projection; lateral margins of lobe thickened; caudal half of floor (ventral surface) of lobe convex, floor moderately punctate; lobe constricted at base, transverse basal sulcus strong, with oblique arms leading into shallow central depression of body, depression with cephalomedian fovea; lamellae punctate, with truncate lateral corners devoid of tubercles; zygoma thick, well arched, cephalolateral margins flanked by usual pits.

Third maxilliped with tip of endopodite extending to distal margin of penultimate podomere of antennal peduncle; basal podomere of exopodite very hirsute, tip reaching base of distal fourth of merus of endopodite; longitudinal ridge of ventrolateral margin of ischium with row of punctations

bearing long setae along inner edge; ventrolateral half of ischium moderately punctate, largely obscured by setae; distolateral corner slightly produced, acute; ventromesial half with rows of long, stiff bristles obscuring all but distalmost end of mesial margin; basis of endopodite with long setae. Right mandible with incisor ridge bearing 7 denticles.

Total chela length 95.5% of TCL; palm (Fig. 1M) 1.6 times wider than long, 1.8 times wider than deep; mesial margin of right palm bearing row of 8 strong tubercles, proximal pair fused at bases; mesial row subtended dorsally by row of 8 smaller tubercles, and others dorsal to them; dorsal surface of palm with many large punctations, some containing small squamous tubercles; distolateral portion of palm costate for about third of length, with mild impression and deep punctations; remaining lateral surface of palm rounded, with 1 or 2 rows of large punctations; ventral surface of palm with scattered punctations, distolateral portion with depression and large punctations; lateral eminence of articular ridge with weak subdistal tubercle, single tubercle proximal to ridge. Fingers of chela of cheliped gaping for most of length, width of gape at base equal to width of base of dactyl; opposable surface of fixed finger with clumps of long, plumose setae on proximal half. Fixed finger dorsolaterally costate, dorsal base of finger with large punctations and moderate impression; dorsal longitudinal ridge well defined, low, flanked each side by punctate groove; lateral surface of finger with staggered row of moderate punctations; ventral surface with very low ridge, flanked each side by row of punctations; opposable surface with subconical tubercle ventral to denticles at base of distal fourth of finger, and 9 tubercles (7 on left) along surface dorsal to denticles, third tubercle from base much larger than others; denticles small, in 2 rows to subconical tubercle, single row from there to third tubercle from base. Dactyl of chela 2.0 times as long as mesial margin of palm,

comprising 61.7% of total chela length; dorsal surface of dactyl with weak longitudinal ridge, flanked laterally by punctate groove, mesially by row of spaced punctations; mesial surface of dactyl with strong tubercles on proximal half, basalmost tubercles in 2 rows, encroaching on dorsomesial surface; ventral surface with low, rounded ridge flanked each side by row of punctations; opposable surface with row of 12 tubercles (13 on left) dorsal to denticles, fourth from base largest and displaced ventrally; denticles small, in 2 rows on distal third of finger, single row to sixth tubercle from base.

Carpus of cheliped (Fig. 1M) 1.3 times as long as wide, 1.2 times length of mesial margin of palm; dorsal surface with deep, oblique sulcus, surface lateral and mesial to which punctate; mesial surface of carpus with large, curved distal spine and strong, subconical proximal tubercle; ventral surface with subconical distolateral tubercle, strong, acute distomedian tubercle, no proximomesial tubercle. Merus of cheliped 1.4 times longer than greatest depth, length 37.2% of TCL; dorsal surface with 2 small subdistal spines and 1 small tubercle; ventrolateral ridge with 2 acute tubercles and 1 rounded distal tubercle, ventromesial ridge with 5 (4 on left) acute tubercles and 1 large distal spine.

Hook on ischium of third pereiopod (Fig. 1I) simple, oblique, relatively acute, distally bent and overreaching basioischial articulation by about half of length; hook opposed by prominent tubercle on basis. Coxa of fourth pereiopod with strong, vertically disposed caudomesial boss. Coxae of third pereiopods, and sternites between third and fourth pereiopods, with long, dense setae obscuring distal portions of in situ gonopods.

Gonopod as described in "Diagnosis."

Description of allotypic female.—Except for secondary sexual characters, differing from holotypic male in following respects: Maximum width of carapace 1.4 times depth; areola 5.2 times as long as wide,

constituting 36.4% of TCL (45.3% of PCL), with 4 punctations across narrowest part. Acumen comprising 45.1% of rostrum length, latter constituting 22.5% of TCL; apical tubercle directed dorsally, reaching distal margin of ultimate podomere of antennular peduncle; subrostral ridge narrow. Cephalic margin of postorbital ridge with strong spine; suborbital angle acute. Cervical spine area with 1 strong spine and several tubercles each side of carapace. Antennal peduncle with strong distolateral spine on basis, slightly weaker ventral spine on ischium; antennal scale 2.8 times as long as wide, mesial margin of lamella broadly rounded. Total chela length 76.6% of TCL; palm 1.5 times wider than long, 1.7 times wider than deep; dorsal punctations without basal tubercles; mesial margin with mesial row of 7 tubercles (8 on left), subtended dorsally by row of 5 smaller tubercles, and row of 3 proximal tubercles dorsal to this row; lateral eminence of ventral articular ridge with strong subdistal tubercle; 1 weak tubercle proximal to ridge. Fingers only slightly gaping in proximal two-thirds of length; dactyl comprising 61.2% of total chela length.

Carpus of cheliped 1.3 times length of mesial margin of palm, ventral surface with acute distolateral tubercle. Merus of cheliped 1.5 times longer than greatest depth, length 35.1% of TCL; dorsal surface with 2 very strong subdistal spines; ventrolateral ridge with 2 strong spines and 1 moderate distal spine; ventromesial ridge with 4 acute tubercles, 3 strong spines (2 on left), and 1 long distal spine.

Annulus ventralis as described in "Diagnosis." In addition, first pleopods strong, distally hirsute; postannular sclerite alate, ventral surface domed and pitted.

Description of morphotypic male, form II.—Differing from holotypic male in following respects: Maximum width of carapace 2.1 times depth; areola 7.8 times as long as wide, constituting 36.4% of TCL (44.9% of PCL), with 4 punctations across narrowest part. Acumen comprising 40.7%

of rostrum length, latter constituting 19.7% of TCL. Cephalic margin of postorbital ridge with strong spine; suborbital angle subacute, with spine. Cervical spine area with 1 spine and several small tubercles each side of carapace. Antennal peduncle with strong distolateral spine on basis, acute ventral tubercle on ischium; antennal scale 2.7 times as long as wide, lamella about 1.4 times width of thickened lateral portion. Epistome with subcordiform cephalic lobe bearing short cephalomedian projection.

Total chela length 78.8% of TCL; palm 1.5 times wider than long, 1.6 times wider than deep; lateral eminence of ventral articular ridge with subacute distal tubercle; 2 moderate and several very small tubercles proximal to ridge. Fingers moderately gaping in proximal three-fourths of length; dactyl 1.9 times as long as mesial margin of palm, comprising 58.8% of total chela length.

Carpus of cheliped 1.2 times as long as wide; dorsal surface with 3 very weak dorsomesial tubercles; mesial surface with strong, curved proximal spine in addition to usual massive distal spine; ventral surface with strong distomedian spine and 1 very small tubercle proximomesial to it. Merus of cheliped 1.5 times longer than greatest depth, length 35.8% of TCL; dorsal surface with 2 strong subdistal spines and 1 small tubercle; ventrolateral ridge with 2 strong spines and 1 moderate distal spine; ventromesial ridge with 6 acute tubercles and 1 long distal spine.

Hook on ischium of third pereopod small, opposed by weak tubercle on basis. Gonopod (Fig. 1E, F) length 23.7% of TCL; proximomesial apophyses weak, bases separated; central projection curved at 90° to shaft, tapered, apex complete, rounded; mesial process inflated at base, tapered, caudally acute, directed caudolaterally; strong juvenile suture present.

Color notes.—Ground color variable, even within same population, but usually olivaceous, greenish, or bluish green. Lateral surfaces of carapace covered with

orangeish, pale tan, or white tubercles, creating densely spotted appearance; dorso-medial half of thoracic section of carapace with broad brown or rust-colored area; cephalolateral rim of carapace, including branchiostegal spine, with narrow orange or tan band. Lateral margin of antennal scale dark; dorsal surface of lamella light and flecked with small, dark spots, ventral surface pale; antennal flagellae green, or brown with greenish tinge. Dorsal surfaces of chelae and fingers olivaceous, orangeish, dark blue-green, or aquamarine; articular ridge tan or orange; lateral surface of entire propodus striking orange, bleeding into orangeish tan on ventral surface of chela and fixed finger, which usually bluish or yellowish tan; mesial area of ventral surface of chela often dark; tips of both fingers orange, tan, or yellowish, color not subtended by black band. Tubercles on mesial margin of palm either ground-color, deep amber, or light tan; those on opposable surfaces of fingers pale tan, white with orange base, or ivory-tan; those on ventral carpus and merus orangeish. Most podomeres of other pereopods aquamarine.

Dorsal and dorsolateral abdomen dark blue-green, each tergite with narrow dark or iodine band along caudal margin; cephalicmost tergite with relatively discrete pale lateral blotch each side, or entire lateral corner pale; ventrolateral pleura with tan blotch or diagonal bar. Dorsal surfaces of telson and uropods dark blue-green proximally, tan or orange distally, spines orange. All ventral surfaces caudal to mandibles pale tan, abdomen often with narrow, pale blue banding; all structures cephalic to light mandible very dark. Annulus dark olive, postannular sclerite deep blue; central projection of male gonopod sometimes red or orange.

Disposition of types.—The holotypic male, form I, allotypic female, and morphotypic male, form II, are in the NCSM crustacean collection (catalogue numbers NCSM 5319, 5320, 5321, respectively), as are the following paratypes and paratop-

types: 2 ♂ I, 1 ♂ II (510), 3 ♂ II, 3 ♀, 2 j ♀ (2079), 1 ♂ I, 1 ♂ II (3322), 2 ♂ II, 3 ♀ (4378), 1 ♂ I, 2 ♂ II, 3 ♀ (4550), and 1 ♂ I, 4 ♂ II (4571). Paratopotypes consisting of 3 ♂ I, 4 ♂ II, 1 j ♂, 3 ♀, 2 j ♀ are deposited at USNM (291470).

Type locality.—North Carolina, Union Co., Bearskin Creek (tributary Richardson Creek, Rocky River subdrainage, Yadkin-Pee Dee River basin) near NC 200 bridge, about 2.4 air km NE of center of Monroe (Monroe 7.5' USGS quadrangle, UTM zone 17, coordinates 3872500/543500).

Range and specimens examined.—Currently known with certainty only from the Cape Fear and Yadkin-Pee Dee river basins in North Carolina, but undoubtedly has a wider distribution. A total of 291 voucher specimens, all at NCSM (except USNM paratopotypes), has been collected at 22 localities in the Cape Fear River basin and 36 localities in the Yadkin-Pee Dee River basin by 51 collectors. A list of localities, dates, sexes, collectors, and catalogue numbers will be included with reprints, available from <John.Cooper@ncmail.net>

Variations.—In addition to those addressed in the "Diagnosis," the following variations have been noted. The rostrum varies from caret-shaped (with slight if any increase in convergence of the margins from the base of the acumen to the apex), to moderately constricted and slightly rounded at the base of a long, narrow acumen. In some specimens, the margins of the rostrum terminate abruptly at the base of the acumen, where they are notably rounded or even slightly produced. The single cervical spine varies from long and acute to a relatively short, spiniform tubercle, and the usually weak branchiostegal spine is strong and well developed in some populations. The cephalic margin of the postorbital ridge may bear a strong, acute spine or a very small tubercle. The width of the lamella of the antennal scale varies from 1.2 to 2.1 ($\bar{X} = 1.6$, $n = 54$) times the width of the thickened lateral margin, and its distal margin is gently to moderately declivous,

rarely strongly so or subtransverse. There are usually 2 spines in each caudolateral corner of the cephalic section of the telson, but several specimens have a single spine in one or the other corner, and 9 of 72 specimens have 3 spines in either corner (a single animal has 3 spines in each corner). The disklike caudal knob is weaker than usual in a few form I males. Of 38 females, the deepest part of the fossa of the annulus is sinistral in 17, dextral in 21. The total length of the chela averages around 98% of TCL for form I males, about 76% of TCL for form II males and adult females.

Size.—The largest specimen is a female with a TCL of 48.2 mm (PCL 39.5 mm). Form I males ($n = 12$) ranged from 27.0 to 42.5 mm TCL (22.2 to 35.3 mm PCL), with means of 32.7 mm TCL (26.9 mm PCL).

Life history notes.—Form I males have been found from late March through early June, and from late September through early November. A female, measuring 26.8 mm TCL (21.9 mm PCL) and bearing 17 third-instar young, was collected on 27 June 1997.

Crayfish associates.—Within the Yadkin-Pee Dee River basin, *C. hobbsorum* has been found with *Procambarus (Ortmannicus) acutus* (Girard, 1852) and *Cambarus (Depressicambarus) reduncus* Hobbs, 1956. Within the Cape Fear River basin, the new species has been collected with *P. (O.) acutus* and *Cambarus (Depressicambarus) latimanus* (Le Conte, 1856). At several localities in both river basins, a number of specimens of another member of the “*acuminatus* complex” have been found in fairly close proximity to *C. hobbsorum* sites, but the two have not yet been found syntopically.

Remarks.—It would be premature at this time to attempt to assess the relationships of *C. hobbsorum*. The species is easily distinguished from all other members of the subgenus *Puncticambarus*, including other known but undescribed species, by the combination of a narrow areola; long, plumose setae on the opposable surface of the

fixed finger of the chela of adults as well as juveniles; a disklike caudal knob on the gonopod of the form I male; and abdominal pleura that are usually subtriangular in outline.

When the analysis of the “*acuminatus* complex” has been completed, the range of *C. (P.) hobbsorum* will almost certainly be found to include other river basins in central North Carolina, and probably South Carolina.

Etymology.—Patronymic, honoring the contributions made to our knowledge of the biology of crayfishes and other decapod crustaceans by the late Horton H. Hobbs, Jr., and Horton H. Hobbs, III, father and son.

Suggested vernacular name: Rocky River crayfish.

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Voucher specimens, all at NCSM (except USNM paratopotypes), have been collected at the following localities: **CAPE FEAR RIVER BASIN**. Alamance Co. - (1) Back Crk at SR 1936; 1 j ♂, 1 ♀, 1 j ♀ (NCSM 5303), 4 Nov 1999, coll. D. R. Lenat (DRL), L. Eaton (LE), T. MacPherson (TM). Chatham Co. - (2) Loves Crk at entrance to Wastewater Treatment Plant road, near Siler City; 1 ♀, 2 j ♀ (4340), 1 ♀ with attached young (4339), 27 Jun 1997, coll. DRL, D. Penrose (DP), LE; (3) Loves Crk near mouth; 1 j ♂, 1 ♀, 1 j ♀ (4349), 27 Jun 1997, coll. DRL, DP, LE; (4) Little Indian Crk at SR 1009; 1 ♂ II, 2 ♀ (1867); (5) Tick Crk at NC 421, 2.1 air km NE of Bonlee, 9.0 air km SE of center of Siler City; 1 ♂ II, 2 ♀ (2573), 29 Jul 1985, coll. DRL, S. Coffey, D. Reid; 1 j ♂ (2575), 1 Aug 1985, coll. F. Winbourne (FW), TM; (6) Rocky R at SR 2170; 1 ♂ II, 1 j ♂, 1 j ♀ (4377), 27 Jun 1997, coll. LE, DP, DRL; (7) Rocky R at NC 902, 11.2 air km WSW of Pittsboro; 2 ♂ II, 3 ♀ (4378), 27 Jun 1997, coll. LE, DP, DRL; 3 ♂ II, 5 ♀, 2 j ♀ (2079), coll. A. L. Braswell (ALB), W. M. Palmer (WMP), D. Biggins, M. Huish, G. Pottern; 1 ♂ II (4695), 10 Jul 1972, coll. F. J. Schwartz & students; 1 ♀ (5320), 6 Sep 1984, coll. ALB, WMP; (8) Rocky R at US 15/501, 11.0 air km ENE of center Goldston, 10.1 air km W of Moncure; 2 ♂ II, 1 j ♂, 3 ♀ & 23 Jul 1990, coll. DP, FW, S. Mitchell, TM, S. Kroger; (9) Rocky R at NC 64, just E of Siler City; 1 ♀ (4629), 9 Jul 1997?, coll. DP; (10) Rocky R at SR 1300; 1 ♂ II, 1 ♀ (4943), 4 May 1998, coll. M. Hale (MH), DRL, N. Medlin (NM), B. Tracy (BT); (11) Bear Crk at SR 2333, 2.2 air km NW of center of Goldston, above Wastewater Treatment Plant; 1 j ♂ (2574), 26 Aug 1991, coll. DP, FW, NM; (12) Bear Crk below SR 2156 bridge, 9.8 air km SW of Pittsboro; 1 ♂ II, 1 j ♂, 2 ♀ (2076), 6 Sep 1984, coll. ALB, WMP; (13) Bear Crk at SR 2187; 3 j ♂, 2 j ♀ (4941), 23 Apr 1998, coll. N. Guthrie (NG), NM, BT, Warner;

1 ♀ (5088), 7 Apr 1999, coll. Flint, MH, BT, NM; (14) Robeson Crk above SR 1943 bridge, 6.6 air km ESE of Pittsboro; 3 j ♂, 1 ♀, 2 j ♀ (2078), 6 Sep 1984, coll. ALB, WMP; (15) Harlands Crk at NC 902, ca. 6.9 air km SW of center of Pittsboro; 1 ♀, 2 j ♀ (4631), 10 Jul 199?, coll. DP. Guilford Co. – (16) Haw R at SR 2109, ca. 4.2 air km SE of Stokesdale; 2 ♂ II, 1 j ♀ (4916), 6 Apr 1998, coll. BT, NM, LE, DP; (17) Reedy Fork Crk at SR 2728, ca. 5.3 air km SW of Monticello; 1 ♂ II (4665), 7 Jul 1998, coll. DRL, TM, MH; (18) Deep R at SR 1113, ca. 4.8 air km SE of Jamestown; 1 ♀, 1 j ♀ (4908), 8 Sep 1998, coll. DP; (19) Rock Branch & nearby trib, ca. 1200' NW of confluence with Haw R; 1 ♂ I, 4 ♂ II, 6 ♀, 4 j ♀ (3037), 29 Mar 1996, coll. WMP, L. Earnest, A. Kyles, R. Pegram. Moore Co. – (20) upper trib Suck Crk; 3 j ♂, 2 ♀, 2 j ♀ (4317), 8 Mar 1986, coll. Division of Water Quality biologists. Randolph Co. – (21) Deep R at Ramseur; 1 ♂ II, 1 ♀ (5069), 30 Jul 1985, coll. DRL. Rockingham Co. – (22) Troublesome Crk at SR 2422; 1 ♀ (C-4663), 6 Jul 1998, coll. DRL, TM, MH.

YADKIN-PEE DEE RIVER BASIN. Cabarrus Co. – (23) Croziers Branch at SR 1171, ca. 5.3 air km WSW of center of Harrisburg; 1 ♂ I, 1 ♂ II (4552), 1 Oct 1997, coll. J. A. Johnson (JAJ), M. R. Wood (MRW); (24) Adams Crk at NC 73, ca. 5.9 air km WNW of Mt. Pleasant; 1 ♂ I, 4 ♂ II (4571), 8 May 1998, coll. JAJ; (25) Little Bear Crk at SR 2453, ca. 4.8 air km E of center of Mt. Pleasant; 1 ♂ I, 2 ♂ II, 3 ♀ (4557), 30 Sep 1997, coll. JAJ, MRW, K. A. Shallcross (KAS); (26) Little Buffalo Crk at SR 2443, ca. 6.9 air km NE of Mt. Pleasant; 1 ♂ I, 2 ♂ II, 3 ♀ (4550), 30 Sep 1997, coll. JAJ, MRW; (27) Dutch Buffalo Crk above SR 1006, 4.8 air mi NNW of Mt. Pleasant; 2 ♀ (4542), 23 Jul 1985, coll. R. E. Noffsinger (REN), R. W. Laney (RWL); 1 ♂ II, 1 j ♂ (2730), 22 Jul 1985, coll. REN, RWL, et al.; 1 ♂ II, 1 j ♂, 2 j ♀ (2280), 27 Mar 1985, coll. DRL;

(28) Dutch Buffalo Crk at NC 49, 1.1 air km SW of jct SR 2442, 4.0 air km NE of center of Mt. Pleasant; 2 ♂ II, 1 j ♂, 1 ♀ (2258), 25 Mar 1985, coll. V. Schneider (VS); (29) Hamby Branch at SR 1132, 8.6 air km SW of center of Concord; 2 ♀, 1 j ♀ (2319), 2 Apr 1985, coll. VS; (30) Hamby Branch at NC 200, ca. 8.8 air km ENE of town Rocky River; 1 j ♂ (4568), 7 May 1998, coll. JAJ, S. Brady (SB), S. Kopplin (SK), J. M. Alderman; (31) Rocky R at SR 2430; 1 ♀ (2272), 26 Mar 1985, coll. DRL; (32) Meadow Crk at NC 200, ca. 0.5 rd km NW of Stanly Co. line, 2.9 air km SE of Georgeville; 1 ♂ II, 1 ♀ (4569), 7 May 1998, coll. JAJ, et al.; 1 j ♂ & exuvium (4565), 8 May 1998, coll. SB, SK; (33) Dutch Buffalo Crk at NC 200 near Georgeville; 1 ♀ (2631), 12 Jul 1989, coll. TM; (34) Dutch Buffalo Crk at NC 49, 1.1 air km SW of jct SR 2442, 4.0 air km NE of center of Mt. Pleasant; 2 ♂ II, 1 j ♂, 1 ♀ (2258), 25 Mar 1985, coll. VS; (35) trib. Big Bear Crk at SR 2450, ca. 10.6 air km NE of center Mt. Pleasant; 7 j ♂, 5 j ♀ (4558), 30 Sep 1997, coll. JAJ, MRW, KS; (36) McKees Crk at SR 1169, ca. 6.4 air km SSE of center of Harrisburg; 2 ♂ II, 8 j ♂, 2 ♀, 10 j ♀ (4555), 1 Sep 1997, coll. JAJ, MRW; (37) Black Run Crk at SR 2408, ca. 1.4 air km WNW of Watts Crossroads; 1 j ♂, 1 ♀ (4567), 6 May 1998, coll. JAJ, SB, SK. Iredell Co. – (38) Dye Crk at SR 1142; 1 ♂ II (2583), 11 Sep 1990, coll. K. Lynch (KL), NM, DRL; (39) Dye Crk at SR 1147; 1 ♂ II (4507), 5 Jun 1985, coll. DP; (40) Rocky R at SR 1142, 7.2 air km SSE of center of Mooresville; 2 j ♂, 1 j ♀ (2321), 3 Apr 1985, coll. VS; (41) Rocky Crk; 1 ♂ II, 1 j ♂, 1 j ♀ (2584); 15 Jun 1985, coll. DP, KL, S. Mitchell. Mecklenburg Co. – (42) Mallard Crk; 2 ♂ I, 3 ♂ II, 1 ♀ (3792), 1 Nov 1990, coll. E. F. Menhinick (EFM) & students; (43) Mallard Crk at SR 2467, ca. 6.2 air km NW of center of Newell; 1 ♂ II, 3 ♀ (3309),

10 Jun 1996, coll. BT, NM. Montgomery Co. -- (44) Little R at SR 1340; 2 j ♂, 2 ♀ (2896), 20 Dec 1994, coll. DRL, NG, K. Herring; (45) Little R at SR 1554 (Troy-Candor Rd); 3 ♂ II, 1 j ♂, 1 ♀ (5434), 23 Aug 1999, coll. K. A. Pipkin, E. A. Alderman, B. T. Watson, A. H. Fullerton. Richmond Co.—(46) off NC 73, 1.6 rd km W of jct SR 1005, 10.9 air km NW of Ellerbe; 1 ♂ II, 3 ♀, 1 j ♀ (2693), 20 Apr 1986, coll. D. Stephan, D. Lockwood. Union Co. – (47) Crisco Branch near confluence Rocky R off SR 1662, 4.0 air km NNE of New Salem; 1 j ♂ (46), 21 Mar 1976, coll. ALB; 1 ♂ II, 1 ♀ (47), 15 Apr 1976, ALB; 1 ♂ I, 2 ♂ II, 1 j ♂, 3 ♀ (2766), 29 Oct 1995, coll. ALB; 1 ♂ I (2770), found in stomach of Rana catesbeiana, 29 Oct 1995, coll. ALB; (48) Duck Crk at US 601, ca. 4.8 air km N of Fairview Crossroads; 1 ♀ (4633), 21 Apr 1998, coll. DP, DRL, LE; (49) South Fork Crooked Crk above SR 1367, 7.4 km E of Indian Trail; 2 ♂ II, 1 j ♂, 1 ♀, 1 j ♀ (3996), 18 Apr 1977, coll. EFM, P. M. Menhinick (PMM); (50) South Fork Crooked Crk at Unionville-Indian Trail Rd, ca. 8.8 km NW of Monroe; 1 ♂ II (4936), 6 Nov 1998, coll. A. Bogan (AB), D. Davenport (DD); (51) South Fork Crooked Crk at SR 1501, ca. 8.8 km NW of Monroe; 1 ♂ II, 1 j ♀ (4937), 6 Nov 1998, coll. AB, DD; (52) Salem Crk at SR 1006, ca. 2.4 air km NE of center of Fairfield; 1 ♂ I, 1 ♂ II (3322), 10 Jun 1996, coll. BT, NM; (53) Goose Crk above SR 1524, ca. 8.6 air km WSW of Fairview Crossroads; 3 j ♂, 2 ♀, 2 j ♀ (4656), 21 Apr 1998, coll. DRL, DP, LE; (54) Stewarts Crk at SR 1510, “below lake;” 1 ♀, 1 j ♀ (5327), 7 Dec 1999, coll. T. Savidge, M. Wood, J. Fridell; (55) Stewarts Crk, 200 m E of NC 601, 3.5 km N of Monroe; 2 ♀ (4075), 23 Aug 1979, coll. EFM, PMM; (56) Bearskin & Richardson crks, 3.2 to 4.8 air km NE of Monroe; 6 j ♂, 5 j ♀ (4048), 29 Jun 1993, coll. EFM, PMM; (57) Bearskin Crk at & near NC 200 bridge, 2.4 air km NE of Monroe (type locality); 3 ♂ I, 4 ♂ II, 1 j ♂,

3 ♀, 2 j ♀ (USNM 291470), 9 May 1998, coll. ALB; 2 ♂ I, 1 ♂ II (510), 26 Apr 1980, coll. ALB; 1 ♂ II (997), 24 Jul 1977, coll. ALB, J. W. Braswell; 1 ♂ I (5319), 1 ♂ II (998), 28 Oct 1979, coll. ALB; 3 ♂ II, 5 j ♂, 6 ♀, 2 j ♀ (2212), 7 Oct 1984, coll. ALB; 2 ♂ II, 1 ♀, 2 j ♀ (3639), 27 Apr 1997, coll. ALB; 1 ♂ II (5321), 9 May 1998, coll. ALB.

Union - Stanly Co. line - (58) Rocky R at SR 1770, ca. 5.0 air km SE of Oakboro;

1 j ♂ (3315), 1 Aug 1996, coll. W. C. Starnes, R. E. Jenkins, J. Crutchfield.