A NEW SPECIES OF FOSSIL BUSYCON (BUSYCOTYPUS) FROM THE LOWER PLIOCENE BUCKINGHAM FORMATION OF FLORIDA (GASTROPODA: MELONGENIDAE)

JAY J. TRIPP
Research Associate, Section of Invertebrate Zoology

ABSTRACT

A new species of the melongenid genus Busycon (Busycotypus), characterized by the double coronation of its carinae, is described from the early Pliocene Buckingham Formation of the Newburn Mine, Sarasota, Sarasota County, Florida. This taxon, Busycon (Busycotypus) bicoronatum, new species, appears synchronic with B. (B.) pyrum floridanum Olsson & Harbison, but distinct from it.

INTRODUCTION

In September 1983, two specimens of unique form were found at the highly fossiliferous Newburn Mine—at that time known as the Macasphalt Company (Division of Ashland Oil, Inc.), No. 0800826—Newburn Road, Sarasota, Sarasota County, Florida. These specimens were taken from a spoil bank created by operating drag-lines in this working mine, and therefore could not be assigned to one particular stratigraphic unit. However, the species is obviously from the Lower Pliocene Buckingham Formation (formerly called Pinecrest Beds; Petuch, 1986, 1987) which comprises most of the exposed profile of the Newburn Mine. These two specimens from 1983 were retrieved along with numerous examples of other Pliocene species, such as well-preserved Hystrivrum locklini (Olsson & Harbison), very large Arcinella cornuta (Conrad), Turbinella regina Heilprin, Contraconus adversarius (Conrad), Siphocypraea carolinensis floridana (Mansfield), and Pyruella rugosicostata Petuch.

Subsequent collecting at this site by the author has produced, rather infrequently, additional examples of this new species. An example from the type locality was collected in 1978 by Ms. Mary Palmer of Alva, Florida, and loaned to become a part of the type lot. These remarkable specimens belong to an undescribed species of the subgenus Busycotypus, here named Busycon (Busycotypus) bicoronatum, new species, (Fig. 1, 2, 5–7, 9, 12).

SYSTEMATICS

Busycon (Busycotypus) bicoronatum Tripp, new species

Fig. 1–12

Holotype.—(Incomplete; nuclear whorl and outer lip margin are damaged): height 95 mm; width 45 mm; spire 23 mm from apex to end of sutural line; body whorl 85 mm including siphonal canal; siphonal canal 45 mm from end of columella, with average width of 6 mm; aperture 32 × 21 mm not including siphon; width of shoulder at sutural end 10 mm; width of channel at sutural end 9 mm; number of whorls 7; spiral cords at end of shoulder 3; width of shoulder at sutural

Fig. 1-4.—Dorsal views of Busycon species. 1. *Busycon (Busycotypus) bicoronatum*; Holotype, CM No. 47197. Height, 95 mm. 2. *B. (B.) bicoronatum*; Paratype 1, CM No. 47198. Height, 45 mm. 3. Recent *B. (Busycotypus) canaliculatum* (Linnaeus), juvenile. Height, 91 mm. 4. *B. pyrum aepynotum* (Dall); type, United States National Museum No. 112026, Alum Bluff, upper bed, Apalachicola River, western Florida, Lower Pliocene (after Mansfield, 1930).
end 10 mm; width of channel at sutural end 9 mm; width of channel at second whorl 2 mm; three spiral threads between last suture and carination.

Type locality.—A spoil bank, Newburn Mine, Apac Fla., Inc. (Ashland Oil, Inc.), D. O. T. 17-087, Newburn Road, roughly five miles east of Sarasota, Sarasota County, Florida, 11 September 1983, Carnegie Museum (= CM) No. 47197 (Fig. 1, 5, 7).

Paratype 1.—Juvenile, height 45 mm, width 25 mm, spire 16.5 mm, body whorl 40 mm, siphonal canal 22 mm, aperture $19 \times 9.5$ mm; same locality and date as holotype, CM No. 47198 (Fig. 2, 6, 9, 12).


The following seven paratypes are in the collection of the author, from the same locality as the holotype:

Paratype 3.—(No. 2.221-j of the lot): Height 61 mm, width 26 mm, collected 30 November 1986, CM No. 47201.

Paratype 4.—(No. 2.221-i of the lot): Height 39 mm, width 28 mm, collected 25 October 1986, CM No. 47202.
Fig. 7, 8.—Apical views of *Busycon* (*Busycotypus*) species. 7. *B.* (*B.*) *bicornatum*; holotype. Width, 45 mm, CM No. 47197. 8. Recent *B.* (*B.*) *canaliculatum* (Linnaeus), juvenile, same specimen as Fig. 3. Width, 55 mm.

Paratype 5.—(No. 2.221-e of the lot): Height 45 mm, width 18 mm, collected 16 August 1986, CM No. 47203.

Paratype 6.—(No. 2.221-a of the lot): Height 31 mm, width 17 mm, collected 10 October 1985, CM No. 47204.

Paratype 7.—(No. 2.221-f of the lot): Height (tip of canal missing) 45 mm, width 25 mm, collected 20 September 1986, CM No. 47205.

Paratype 8.—(No. 2.221-d of the lot, with badly broken lip): Height 29 mm, width 15 mm, collected 19 May 1986, CM No. 47206.

Paratype 9.—(No. 2.221-h of the lot): Height (tip of canal missing) 51 mm, width 31 mm, collected 11 October 1986, CM No. 47207.

Additional Material Examined.—Eight additional incomplete specimens were collected with the help of Mr. Thomas Ketter at the type locality in 1986, the largest of which measures 108 mm in height. Although mostly complete early whorls and/or upper body whorls only, these fragments are recognized as belonging to *Busycon* (*Busycotypus*) *bicornatum*, new species.

Description.—The adult holotype is dextrally coiled, pyriform, slender, and lightweight. The protoconch, partially broken, comprises the first one and one-half apical whorls. The spire, protracted and scalariform, with seven whorls, forms an angle of 65°. The height of the spire is less than one-fourth of the total height of the shell. Each whorl has a double carina with fine, close, and regular crenulations on each. On the body whorl, which is % of the height of the shell, the crenulations of the outer carina form 18 knobs on the middle section of the spire, but smooth out to become almost a rounded rib near the aperture. The suture forms a very wide, deep, channeled sulcus. This sulcus, 9 mm wide on the penultimate whorl, slopes inward toward the suture, and is smooth except for very
fine, close oblique wrinkles of growth. The shoulder is slightly concave, with three spiral cords at the end, crossed by irregular, sometimes waving, lines of growth. The aperture is oval-elongate, corresponding in height to one-third of the total height of the shell, with its upper end elevated, forming a narrow sinus. Its marginal lip is broken, but inside, at the top near the shoulder, faint lirae remain. The deep interior is smooth and shiny. The surface of the shell is sculptured with evenly-spaced, prominent but fine, spiral ridges, including the area between the carinae. The columella has a faint glaze remaining, with one rather long, oblique ridge or plait crossing the pillar at the point where the siphonal canal bends slightly; the spiral ridges also show lightly across the top of the columella.
Paratype 1, CM No. 47198: this is a juvenile, also dextral, with a nucleus of one and one-half smooth, globose whorls; typical sculpture begins on the second half of the first post-nuclear whorl; four post-nuclear whorls are present; body whorl is strongly-knobbed. Spire angle is 61°, more acute than that of the holotype, and almost tilted or depressed on the dorsal side. Interior of outer lip has close, strong lirae, and a smooth, deep interior. Space between the two carinae bears only two horizontal ridges; finer secondary cords are mid-way between major spiral cords on the body whorl. All other features correspond to the adult, as in the holotype.

**Etymology.** — This new species is named for the doubly carinate whorls which adorn the spire.

**Remarks.** — This distinctive busyconine species is rare at the type locality, and has seemingly been collected only when the mine is digging into the lower level. The material described in this paper was found only in the central part of the pit, as it now exists. In all probability, the species developed and died out within a relatively short interval of the Lower Pliocene, because weekly collecting by the author during the first three months of 1987 has been devoid of any additional specimens of this species. At the current time, index fossils of the younger Caloosahatchee Formation are commonly found, such as *Hystrivasum horridum* (Heilprin), a small number of *Siphocypraea problematica* (Heilprin), *Chicoreus (Chicoreus) floridanus* Vokes, and *Murex (Phyllonotus) pomum* Gmelin, among others.

*Busycon (Busycotypus) bicoronatum* is apparently a taxon from the lineage of species characterized by the living and well-known *Busycon (Busycotypus) canaliculatum* (Linnaeus) (Fig. 3, 8), from which it differs (comparing specimens of similar size) by its more slender form, longer siphonal canal, deeper and wider sutural channel, less scalariform spire, stronger surface ridges, and strongly-knobbed sutural margins, as opposed to the beaded sutures in *Busycon (Busycotypus) canaliculatum*.

**Comparisons.** — *Busycon (Sycotypus) concinnum* Conrad (1875) from King’s marl pit, Sampson County, North Carolina, is similar in some features to the new species. Both have strongly carinated and scalariform early whorls, with definite, but fine, horizontal ridges over the entire surface. However, on *B. concinnum* the body whorl lacks low knobs and retains only a suggestion of the carina on the lift of the posterior apertural lip. *Busycon concinnum* has only a single carina on the whorls; in addition, the body whorl declines more rapidly to the canal. *Busycon (Busycotypus) bicoronatum* is more graceful, with a longer canal, narrower body whorl, and very narrow aperture.

*Busycon (Busycotypus) pyrum floridanum* Olsson & Harbison, 1953 (Fig. 11), has a wide, deep sulcus and a double carina after the suture. The outer of the two ridges bears tiny raised beads on the spire whorls only. On the mature body whorl, this coronation becomes obsolete, the carina becoming a smooth cord. The coronation is never as intense as in the new species. In *Busycon (Busycotypus) bicoronatum*, the coronation of the carinae carries into the adult stage, and the spire is much more scalariform. *Busycon pyrum floridanum* has a profile with a less pronounced spire overall. Known specimens of the new species are smaller than the larger specimens of *B. pyrum floridanum*.

*Busycon excavatum* (Conrad, 1840), from the Upper Miocene, has the deep, wide sutural sulcus of *B. bicoronatum*, but it lacks the very strong coronation of the new species.
Fulgur pyrum var. aepynotum Dall, 1890 [holotype: United States National Museum No. 112026, from the Lower Pliocene of Alum Bluff (upper bed, Apalachicola River, western Florida)], is quite similar to the new species. Dall did not figure his variety, but gave only the brief description, “has a medium sutural canal, an excavated keeled shoulder, undulate or subtuberculate and very coarse, broad spirals with wider interspaces.” Dall stated that the largest specimen he had seen was 30 × 50 mm. The largest, but easily recognizable, fragment in the type material of the new species measures 108 mm, and still retains the constant features of the species, although the body whorl is largely missing.

Mansfield (1930, pl. 8, figs. 1, 6) later figured Dall’s specimen as Busycon pyrum aepynotum (Dall, 1890), apically and dorsally only (reproduced here in Fig. 10 and Fig. 4, respectively), and believed it to be closely related to Busycon pyrum incile from the Yorktown Formation of Virginia. Gardner (1944) reillustrated Mansfield’s figure of Dall’s B. p. aepynotum (pl. 50, fig. 12).

The dorsal view of Mansfield’s figure of B. p. aepynotum shows a stout, solid shell, less graceful than B. bicoronatum, and proportionately shorter, the width equalling one-half the height (Fig. 4). In B. bicoronatum the width is less than half the height. The outside cord at the shoulder of B. p. aepynotum, although certainly a juvenile at 43 mm, is very strong, but does not have the heavy tubercles of the B. bicoronatum crown. The holotype of B. aepynotum appears to carry one true corona on the apical whorls to the outside of the shoulder. In contrast, all specimens of comparable size in the type lot of B. bicoronatum have distinctly doubled carinae.

Spiral cords on the body whorl of B. p. aepynotum are fewer, stronger, more pronounced, and more rugged than those of B. bicoronatum. On the other hand, the body cords of B. bicoronatum are more numerous and much finer, and tend to become obsolete near the bottom of the canal as they descend. The heavy, coarse spirals of B. p. aepynotum continue in strength to the very tip of the canal. The major spiral cords on the body whorl of the new species tend to have finer minor cords between them. These secondary cords are not apparent on Mansfield’s figure of B. p. aepynotum. These dissimilarities between B. bicoronatum and B. p. aepynotum are constant throughout the known material of B. bicoronatum, where the deviation of characters is very slight.

In view of these marked differences between B. aepynotum and B. bicoronatum, the new material warrants species recognition. The Recent busyconines have a limited distribution due to the lack of an active free-swimming larval stage, caused by the loss of the velum before the animal emerges from the egg-capsule (Puffer and Emerson, 1954). B. aepynotum is distinct, although perhaps synchronic, with the Lower Pliocene taxon found farther south, here named B. (Busycotypus) bicoronatum.

In summary, the presumably derived features that distinguish the new species from all others are the scalariform spire, the wide, deep sutural channel, and the highly-coronated double carina, with prominent but fine major and minor cords evenly spaced on the body whorl.

Considering the similarity of general characteristics within this particular group of sulcate species from the Upper Miocene or Lower Pliocene to Recent, which prevails in the extant species Busycon (Busycotypus) canaliculatum (Linnaeus), it is hypothesized that the group conforms to the biological concept of a superspecies, an evolutionary assemblage of closely related species distinguished by slight, but consistent morphological differences. If the morphological criteria for separating
other species of Busyconinae, living or formerly coeval, are accepted, then *Busycon (Busycotypus) bicoronatum* constitutes another suitably characterized species in the subfamily.

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