FURTHER COMMENTS ON *HEXAPLEX FULVESCENS* (SOWERBY) AND *HEXAPLEX HERTWECKORUM* (PETUCH) (MOLLUSCA:GASTROPODA)

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In my original discussion (Vokes, 1968, p. 104) of *Hexaplex fulvescens* (Sowerby, 1834), I noted that the species "first appears in the upper Miocene Pinecrest Beds of southern Florida. It is never exceedingly abundant but it is well represented at several different Miocene localities in the vicinity of Lake Okeechobee." As we now know, the Pinecrest Beds (= Fruitville Formation of Waldrop and Wilson, 1990) are middle Pliocene and not "Miocene."

During the years of 1965 and 1966, at the localities along the Kissimmee River, north of Lake Okeechobee (TU localities 728, 729, 730, 769), we collected many muricid specimens, which I identified as being the same as the living *H. fulvescens*, but all were either juveniles or poorly preserved adults. Consequently, the two "Miocene" specimens I selected to figure in the 1968 work came from the beds along "Alligator Alley" (TU locality 797), where we also had collected numerous examples of what I took to be the same species.

Then, in 1969, at the now famous locality at Sarasota (TU 1000; originally the Warren Brothers pit, then McAsphalt, now APAC) large numbers of a species of *Hexaplex* began to be collected that was the same as those figured from "Alligator Alley" and obviously was *not* the same as *H. fulvescens*. Dazzled by the magnificent specimens from Sarasota, to my great embarassment I must confess I never once reexamined the miserable Kissimmee material.

In the first part of my summary and revision of the Cenozoic Muricidae (Vokes, 1990, p. 79), I acknowledged that the Pinecrest specimens I had originally assigned to *H. fulvescens* were actually *H. hertweckorum*, and added that true *H. fulvescens* had not been collected from beds earlier than the Late Pleistocene. No specimens to my knowledge had ever been collected from either the Caloosahatchee or Bermont formations, unless the locality TU 578 in St. Lucie County belonged in the latter formation.

In the most recent revision of the Cenozoic Muricidae (Vokes, 1992, p. 2) I stated that there must be post-Pliocene beds exposed somewhere at Sarasota because of the presence of the form that Petuch (1991, p. 26, pl. 4, figs. 3, 4) named *Muricanthus trippae*, but which I consider to be a synonym of *H. fulvescens*.

My attention was directed to the problem of the temporal distribution of *H. fulvescens* during a perusal of the paleontological collections at the Florida Museum of Natural History, Gainesville. There, from a locality on the Kissimmee River (UF HG001 = TU 770), were several specimens of what I would call *H. fulvescens*. This prompted my (belated) reexamination of our collections from the Kissimmee area and I realized that my original assessment was correct, there are specimens of true *H. fulvescens* in the Pliocene beds along the Kissimmee River.

The determination that *H. hertweckorum* is distinct from *H. fulvescens* has not changed. The only thing that has changed is the realization that both species occurred simultaneously in the Pliocene of southern Florida, rather than, as I erroneously concluded, *H. hertweckorum* being confined to the Pliocene beds and *H. fulvescens* confined to the post-Caloosahatchee beds.

Curiously, so far as I know, neither species has been taken in the Caloosahatchee Formation. In the Pinecrest Beds *H. hertweckorum* predominates in the vicinity of Sarasota, to as far south as "Alligator Alley." But in the more easterly beds, north of Lake Okeechobee, the main species is *H. fulvescens*. Neither species is absolutely confined to one area. In the Florida Museum collection there is one example of *H. hertweckorum* from the Kissimmee area and the species described as *H. trippae* (Petuch) indicates that rare specimens of *H. fulvescens* also occur in the Sarasota area.

In the Florida State Museum there are also many specimens of *H. fulvescens* from the Leisey Pit, near Ruskin, southwestern Hillsborough County. As Lyons (1991, p. 158) has discussed, the beds at the Leisey pit are unquestionably from the Bermont Formation (early Pleistocene).

Therefore, it is now obvious that *H. fulvescens* has been present in southern Florida since the Pliocene, and it was a contemporary of *H. hertweckorum*. Why the two species should have almost mutually exclusive ranges is not known. There must be some ecologic reason for the distribution, but what it is remains to be discovered.

Both species are assumed to have made their way to the American continent from the Old World. There is no American ancestor for either species. *Hexaplex fulvescens* [and its West Coast cognate *H. princeps* (Broderip, 1833)] is most closely related to the *H. rosarium* (Röding, 1798) complex that occurs in many forms (? species) along the western coast of Africa. It most especially resembles the form known as *Murex turbinatus* Lamarck, 1822 [not *M. turbinatus* Brocchi, 1814, = *H. canariensis* (Nordsieck, 1975); see Radwin and D'Attilio, 1976, p. 93, pl. 7, fig. 3, as *Phyllonotus trunculus*]. *Hexaplex hertweckorum*, as previously discussed (Vokes, 1988, p. 25) is most closely related to the living *H. duplex* (Röding, 1798) (see Radwin and D'Attilio, 1976, pl. 16, fig. 7), from the west coast of Africa.*

Therefore, my previous statements concerning *H. fulvescens* must be emended to note that the species first occurs in the Pliocene Pinecrest Beds (= Fruitville Formation) in the area to the north of Lake Okeechobee. Although there is a lack of specimens from the Caloosahatchee Formation, probably due to the carbonate nature of the unit (*H. fulvescens* prefers a clastic substrate), in the Bermont Formation of western Florida (and possibly eastern Florida at TU 578) the species reapppears and continues to be present in the same region until today.

In contrast *H. hertweckorum* is a true "waif," having come in to the Gulf of Mexico during the Early Pliocene, at the same time as it also made its way through the Bolivar Trough (Atrato Basin) to northwestern Ecuador (see Vokes, 1988, p. 24, pl. 1, fig. 8) and then quickly disappeared.

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LOCALITY DATA

The following are Tulane University fossil locality numbers:

578. ?Bermont Formation. "Rim Ditch," spoil banks one-half mile south of Florida Highway 68 (Sec. 8, T35S, R38E), St. Lucie Co., Florida.
728. Pinecrest Beds [Fruitville Fm.], spoil banks on the west side of Kissimmee Canal and east side of Kissimmee River, just across from U.S. Corps of Engineers Structure 65-D (Sec. 33, T36S, R33E), Okeechobee Co., Florida.
729. Pinecrest Beds [Fruitville Fm.], spoil banks on west side of Kissimmee Canal and east side of Kissimmee River, approximately 1/2 mile south of U.S. Corps of Engineers Structure 65-D (S 1/2 Sec. 33, T36S, R33E), Okeechobee Co., Florida.
730. Pinecrest Beds [Fruitville Fm.], embankment of Seaboard Airline Railroad, just west of Kissimmee River (NW 1/4 Sec. 20, T36S, R33E) Highlands Co., Florida.
769. Pinecrest Beds [Fruitville Fm.], spoil banks on east side of Kissimmee River, 1 1/2 to two miles south of U.S. Corps of Engineers Structure 65-D (NE 1/4 Sec. 35, T36S, R33E), Okeechobee Co., Florida.
770. Pinecrest Beds [Fruitville Fm.] and Caloosahatchee Fm. mixed, spoil banks on west side of Kissimmee River, 1 1/2 to 3 1/2 miles north of Florida Highway 70 (Secs. 10, 14, 15, and 28, T37S, R33E), Highlands Co., Florida.
797. Pinecrest Beds [Fruitville Fm.], material exposed during construction of "Alligator Alley," 13.3 miles east of Florida Highway 29 (T49S, R32E), Collier Co., Florida.
1000. Pinecrest Beds [Fruitville Fm.], borrow pits at east end of 17th St. about 8 miles east of U.S. Highway 301 [now northwest of Fruitville Rd. exit on I-75], at Sarasota (T36S, R19E), Sarasota Co., Florida.

*In addition to these two species, the other members of American Pliocene to Recent *Hexaplex* also are derived from West Africa. The origins of the *H. radix-ambiguus-nigritus* complex on the west coast of tropical America seem to lie with the West African *H. angularis* (Lamarck, 1822) (see Radwin and D'Attilio, 1976, pl. 12, fig. 4), the only dark-colored form among the African species, all of which have a long fossil history in the Mio-Pliocene of the Mediterranean region. Presumably the peculiar West American *H. brassica* (Lamarck, 1822) (see Radwin and D'Attilio, 1976, pl. 16, fig. 5) is derived from the ancient line of *H. trunculus* (Linné, 1758), which also is well represented in the Mio-Pliocene of the Mediterranean Basin.

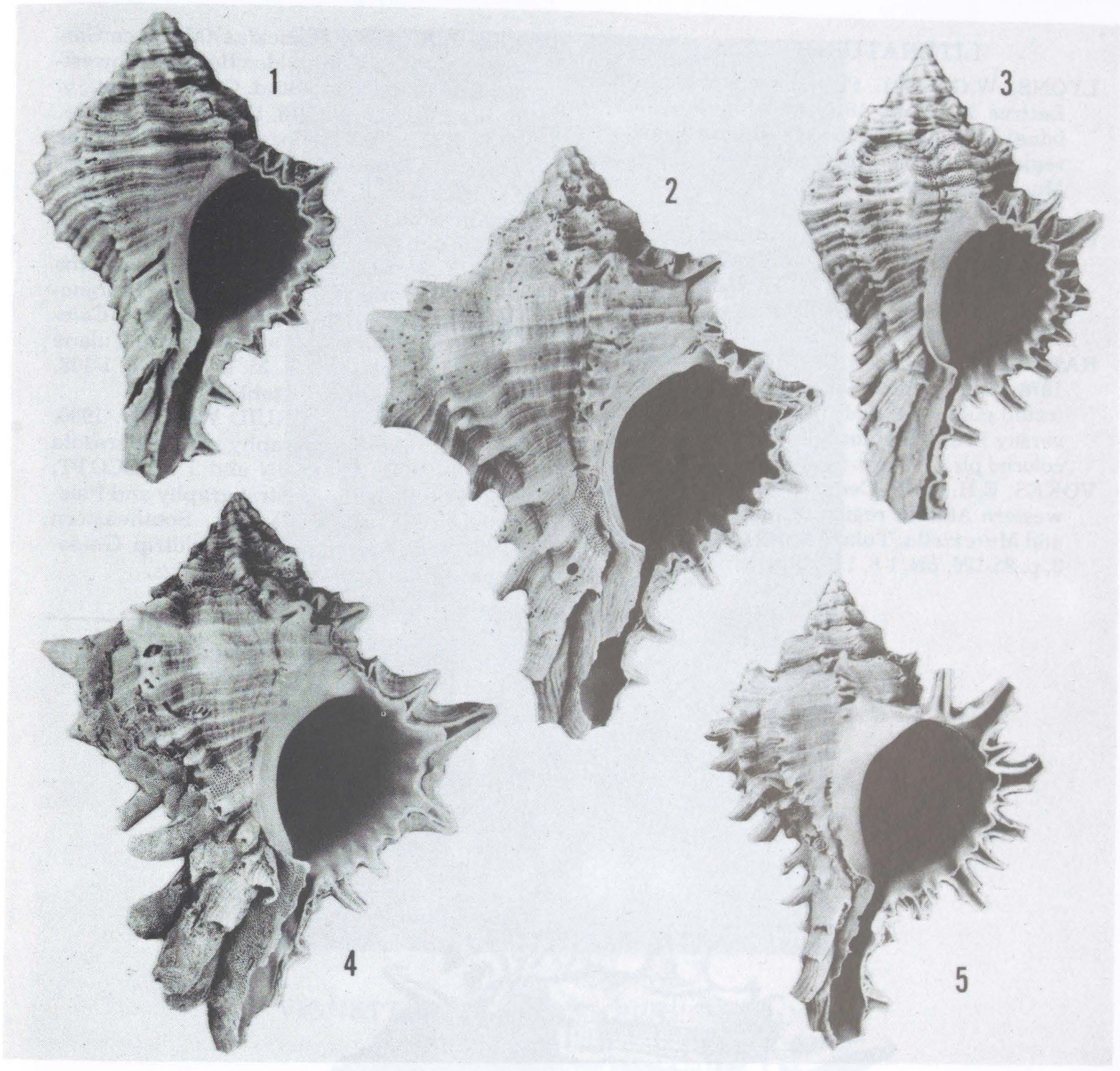

PLATE 1

Figures

1-4. *Hexaplex fulvescens* (Sowerby, 1834)

1. (X 1 1/4) UF 49178; height 46.8 mm, diameter 30.5 mm.
   Locality: Kissimmee River, Florida (= TU 770); Pinecrest Beds [Fruitville Formation].
2. (X 1) CM 35636 (holotype – *Muricanthus trippae* Petuch); height 67.6 mm, diameter 54.0 mm.
   Locality: APAC Pit, Sarasota, Florida (= TU 1000); Pinecrest Beds [Fruitville Formation].
3. (X 1 1/4) Vokes Collection; height 46.4 mm, diameter 30.5 mm.
   Locality: TU R-60, off Panama City, Florida, in 31 m; Recent.
4. (X 3/4) Vokes Collection; height 80.5 mm, diameter 67.8 mm.
   Locality: TU R-60, off Panama City, Florida, in 31 m; Recent.

5. *Hexaplex hertweckorum* (Petuch)
   (X 1) Vokes Collection; height 57.9 mm, diameter 43.2 mm.
   Locality: TU 1000, Sarasota, Florida; Pinecrest Beds [Fruitville Formation].

(Diameter of all specimens includes spines)

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