tillo 1970). I have collected it in Costa Rica in Cartago Prov., between Sta. Cruz and Coliblanca at 1600m altitude. Another specimen in my collection is from cloud forest at Monteverde, Puntarenas Prov. On the basis of these records, *H. rotundicornis* appears to inhabit forests of the mountainous "backbone" of Costa Rica and western Panama.

I report a second species, *H. yucatanus*, for the first time in Guatemala from a specimen collected by Enio Cano in June, 1988 from Uaxactún, Petén, and another specimen from San Francisco near Flores, Petén, brought to me by Enrique Guillén in April, 1989.

This species is the only passalid endemic to the Yucatán Peninsula, known previously only from Campeche, Yucatán and Quintana Roo. Though the Petén of Guatemala is wetter than the areas of Mexico to the north, the collecting areas are still in Subtropical Moist Forest sensu Holdridge (1967). Actually, according to De la Cruz (1982), the area around Flores is near the transition to Subtropical Wet Forest. Perhaps this represents a limiting factor in the distribution of this species.

Reyes-Castillo (1970) cites *Verres cavicollis* Bates from Veracruz to Costa Rica. I here extend its range to western Panama. I collected it in Chiriquí at Río Cotito in a second growth area with coffee plantation and tree ferns at 1125 m elevation.

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HOSTS OF *BEPHRATELLOIDES CUBENSIS* (HYMENOPTERA: EURYTOMIDAE) IN FLORIDA

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The annona seed borer, *Bephratelloides cubensis* (Ashmead), is an important pest of *Annona* species in southern Florida (Peña et al. 1984). The eggs, larvae, and pupae develop in the seeds of growing fruits, and the adults tunnel out through the flesh before

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the fruit is ripe. Reproduction is thelytokous: females are produced parthenogenetically, and males are very rare.

The annona seed borer was first reported from Miami in the early 1920's (Bruner & Acuña 1923). Its known distribution also includes the Caribbean, Mexico, Central America, northern South America and possibly Peru (Grissell & Schauff 1990). It has recently become established in Hawaii (Heu 1988). No other species of *Bephratelloides* has been recorded from the United States.

In Dade County, the major annona-growing area in Florida, plantings of sugar apples (*Annona squamosa* L.) and atemoyas (*A. squamosa* x *A. cherimola* Miller) have increased in the past decade to 72 hectares. Small commercial plantings of bullock's heart (*A. reticulata* L.), a common dooryard tree, have also recently appeared. In addition to these commonly cultivated species, the native pond apple (*A. glabra* L.) grows abundantly in wetlands south of Lake Okeechobee, and several other related species have been planted in small numbers on an experimental basis as potential fruit or rootstock trees.

Seven species have been recorded as hosts of *B. cubensis* in the Neotropics: *A. squamosa*, atemoya, *A. reticulata*, *A. glabra*, *A. muricata* L., *A. cherimola*, and *A. bullata* (Grissell & Schauff 1990), all of which are grown in southern Florida. Given the oligophagous nature of the seed borer, and the proximity with which host and non-host species of Annonaceae are grown in groves and in botanical collections in Florida, we undertook a search for additional host species.

Thirteen species of *Annona*, two of *Rollinia*, and one of *Cananga* were studied in various locations. All annonaceous plants of fruit-bearing age at the Fairchild Tropical Garden Research Center (FTG) in Miami were surveyed. *Rollinia mucosa* (Jacq.) Baillon was examined at one location in Homestead. *Annona diversifolia* Safford, *A. montana* McFadden, *A. muricata*, and *Cananga odorata* Lamarck were examined in two locations in Homestead, and in FTG. *Annona reticulata* and *A. squamosa* were studied in Homestead, FTG, and at the Tropical Fruit Introduction Center of the U.S. Department of Agriculture in Miami. Atemoyas were studied at FTG and in several locations in Homestead. In all cases, the plants were adjacent to atemoya and sugar apple trees which were known to be infested by *B. cubensis*. (*Annona bullata* was not studied because the only available mature, fruiting, tree was not adjacent to atemoyas or sugar apples.) The plants were checked monthly from December 1987 to November 1988. To understand whether lack of infestation was not due to lack of availability of young fruits, we noted the flowering and fruiting phenology of each plant species. We examined all fruits within reach (including fallen fruits), noting their level of maturity and the presence or absence of the diagnostic emergence holes of *B. cubensis*.

Infestations of *B. cubensis* in *A. squamosa* and atemoya trees spread to *A. reticulata*, *A. muricata*, *A. glabra*, and *A. montana*. *A. montana* is a new host record. The other 10 species examined were not infested. *Cananga odorata* and the two *Rollinia* species were not expected to be hosts since the established host record included only *Annona* species, but *Rollinia* is closely related to *Annona* (Morawetz et al. 1987) and therefore merited inspection.

The fruiting phenologies of the plants (Fig. 1) explain why certain species were not infested. At FTG, two trees of *A. dioica* A. St. Hilaire, one of *A. purpurea* Sessè et Mociño, and two shrubs of *A. nutans* (Fries) did not set fruit during our study, and are not known to set fruit naturally in Florida (J. Popenoe, personal communication); unless induced to set fruit, they should not be considered potential hosts of *B. cubensis* in this area. *A. cherimola*, a known host, fruits poorly in Florida and has no records of seed borer infestation there; however, if varieties are developed which fruit regularly, they will probably become infested. Of the non-commercial species which fruit regularly in Florida, all had young fruits (the suitable stage for oviposition [Bruner and Acuña 1923])

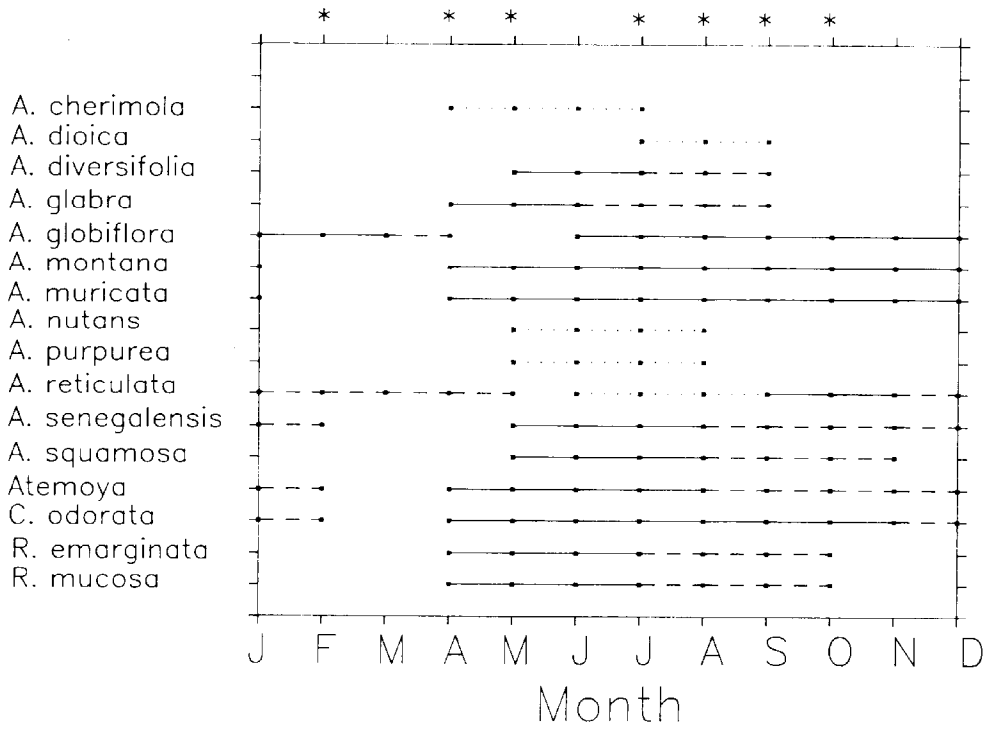

Fig. 1. Flowering and fruiting phenologies of annonaceous species in Dade County, Florida, 1988. Dotted lines: flowering without fruit set. Solid lines: flowering with fruit set. Dashed lines: fruits only. Asterisks indicate months in which adult *Bephratelloides cubensis* had emerged in all of the study areas.

when adult *B. cubensis* were present; species which were not infested are probably not attractive or are unsuitable as hosts for the wasp.

The fruiting phenologies of the host species also explain the ability of seed borer populations to overwinter in Florida. The generation time of *B. cubensis* is two to three months (Bruner & Acuña 1923, Nadel & Peña, in press). Adult annona seed borers emerged from *A. reticulata* in FTG during the spring and probably completed two generations in atemoya and *A. squamosa* before reinfesting *A. reticulata* in the autumn. The fruiting phenologies of the most widely cultivated annonas in Florida, namely the spring-summer fruiting of atemoya and *A. squamosa*, and the fall-winter fruiting of *A. reticulata*, provide the annona seed borer with a plentiful succession of host fruits throughout the year. We did not determine the number of generations of seed borers in *A. reticulata*. The April and May emergence of seed borers from *A. reticulata* may result from eggs deposited in older fruits during February, or from individuals from the previous autumn whose development was slowed by cooler temperatures.

Although pond apples are common native plants, infestations by the seed borer appear to be restricted to botanical collections where they grow near other infested trees which provide year-round hosts. During 1988, we examined mature pond apple fruits in Everglades National Park (Shark Valley, Pa-Hay-Okee, and Royal Palm Hammock), Chekika State Recreation Area, and along State Highway 41, but found no evidence of infestation by the seed borer.

In conclusion, *A. glabra, A. muricata, A. squamosa, A. reticulata,* and atemoya, all previously recorded as hosts of *B. cubensis*, became infested during our host survey.

Although the fruits of several other annonaceous species were available to adult seed borers in the study areas, only *A. montana* became infested.

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DISTRIBUTION OF BOT LARVAE, *CEPHENEMYIA* SPP. (DIPTERA: OESTRIDAE) FROM WHITE-TAILED DEER (*ODOCOILEUS VIRGINIANUS*) IN FLORIDA

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Little is known about deer bot flies (*Cephenemyia* spp.) in the state of Florida. The first account of an adult fly from Florida has been published only recently and was based