

FIG POLLINATING WASPS OF FLORIDA¹
(Hymenoptera: Agaonidae)

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More than 18 species of wasps have been found in fig fruits in Florida. Only four of these (all Agaonidae) are known to be pollinators. Agaonid wasps are easy to identify since the females (Fig. 1) have a number of unique characters, such as a rasp-like appendage on the mandible, a strongly grooved head, and a short hind tibia which is less than one-half the length of the hind femur and hind tarsus. The wingless male (Fig. 2) has the abdomen drawn out into a long tube which is normally curled beneath the body. The other wasps are either parasites, sycophiles, inquilines, or of unknown relationships. The biology of the pollinating fig wasps is complex. The fig pollinating wasps have winged females that can move from one fig fruit to another effecting pollination, and wingless males that mate and die in the same fruit. The most famous species is *Blastophaga psenes* (L.) which reproduces in *Ficus carica* L. and is carried by man to orchards in many parts of the world. In Florida, the edible figs do not

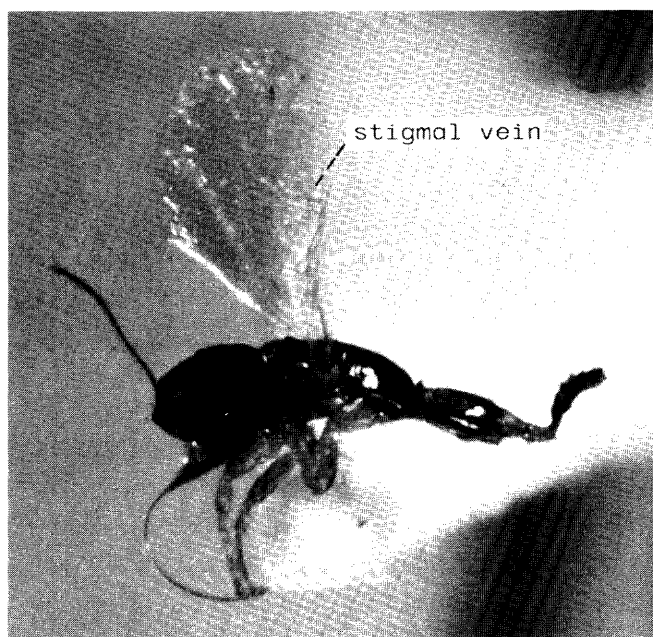


Fig. 1. Female *Pegoscapus jimenezi*
(DPI Photo #87080)



Fig. 2A. Male *Pegoscapus jimenezi* (DPI
Photo #87080)

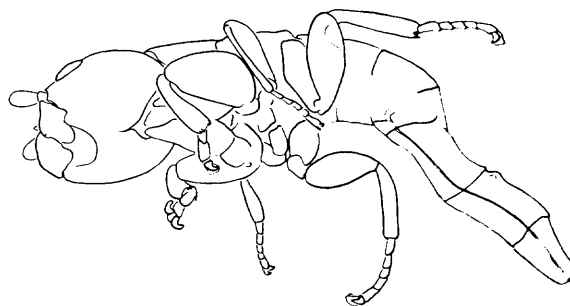


Fig. 2B. Male *Pegoscapus* (after
Wiebes, 1983)

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depend on this wasp for fruit setting, and the wasps are not present here. For many years, only one Florida species of fig pollinating wasp was recognized, *Secundeisenia mexicana* (Ashmead). However, Wiebes (1983) discovered that two species are involved, each specific to its native host. These are now placed in the genus *Pegoscapus* Cameron. *Pegoscapus assuetus* (Grandi) pollinates *Ficus citrifolia* P. Miller, and *Pegoscapus jimenezi* (Grandi) pollinates *Ficus aurea* Nutt. Two additional fig pollinating wasps have become established in Florida in the past few years on exotic *Ficus*. One species, *Parapristina verticillata* (Waterston) has been found in the Asian laurel fig. The fourth species is *Eupristina masoni* Saunders, which is found in the Asian fig, *Ficus benghalensis*. Also of interest is the establishment of *Odontofroggattia galili* Wiebes (Fig. 8,9) in Dade County on *Ficus microcarpa*. This species is a sycophile stimulating parthenocarpic fruit (Galil and Copland, 1981). A key to the species based on females is provided. In most cases the fig wasp can be identified by knowing the host fig. However, we have found a few instances where fig wasps enter figs other than their usual host. *P. assuetus* has been found in *Ficus septica* and *P. verticillata* has been found in the native strangler fig, *Ficus aurea*.

KEY TO FIG POLLINATING WASPS
OF FLORIDA (FEMALES)

1. Antennal funicle with numerous long setae which are several times longer than segment length (Fig. 3)
. *Parapristina verticillata*

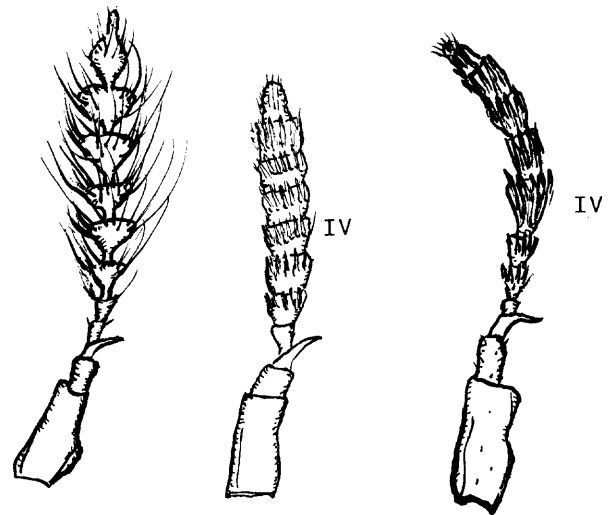
Antennal funicle with all setae shorter than segment length . 2

2. Forewing without stigmal vein; antennal funicular segment IV about 2x longer than III (Fig. 5)
. *Eupristina masoni*

Forewing with stigmal vein (Fig. 1); antennal funicular segment IV slightly shorter than III (Fig. 4) 3

3. Mandible with medium size median tooth, apical tooth short (Fig. 6)
. *Pegoscapus assuetus*

Mandible with very small median tooth (sometimes lacking) and a very long projecting apical tooth (Fig. 7)
. *Pegoscapus jimenezi*



3. 4. 5.
Parapristina Pegoscapus Eupristina
Female Antenna



6. *P. assuetus* 7. *P. jimenezi*
Female Mandible

1. *Parapristina verticillata* (Waterston). Originally described from Asia where it pollinates the laurel fig, *Ficus microcarpa*. It was successfully introduced into Hawaii in 1921 (Condit, 1969). This species was first collected in the Miami area in March 1986 in seeded fruits of *Ficus microcarpa* and also in the native fig, *Ficus aurea*. It is known also from Bermuda on *F. microcarpa*. Since many laurel figs are imported from Hawaii into Florida with no regulatory action, it is probable that this was the mode of introduction. Three associated symbiont wasps are known also from the laurel fig in Florida in addition to a species of *Odontofroggatia* (Pteromalidae). One of these, *Walkerella yashiroi* (Ishii) probably shares fig florets with *Pegoscopus* but develops faster, resulting in starvation of the agaonid wasp, based on studies in Europe (Wiebes, personal communication) on *B. psenes* and *Walkerella*. The other species, *Philotrypesis emeryi* Grandi (Torymidae) and *Micranisa* sp. (Pteromalidae) have unknown relationships. Laurel fig is becoming a weed pest in southern Florida. All the naturalized plants observed in Florida grew as epiphytes or on manmade structures, apparently sown by birds.

2. *Eupristina masoni* Saunders. Originally described from Asia, this species was identified by Wiebes from specimens collected in the Miami area from seeded figs of *Ficus benghalensis* (banyan tree) in 1986.

3. *Pegoscopus assuetus* (Grandi). This wasp was described from Brazil. It is common in the fruits of *Ficus citrifolia* wherever it is found in Florida. Frank (1984) discussed the behavior and morphology of the species. *F. citrifolia* differs from *F. aurea* in that the syconia have a peduncle with the ostiolar scales exposed but tightly packed. Only when the scales become loosened can the female gain entry to lay eggs (9-110 eggs per female). Males emerge first, find parasitized ovaries (galls) containing females, chew holes in the galls, insert the telescoping abdomens, and mate with the females. Males then chew exit holes through the fruit through which females emerge by enlarging the holes into the central cavity of the syconium. Females first search for pollen after mating. They gather pollen in their pretarsal arolia first, then transfer it to coxal pockets, from which it is later transferred to the mesothoracic pockets. After obtaining pollen loads, the females quickly leave the syconia and fly away to other fruits, avoiding predation by ants (especially *Pseudomyrmex*).

Five species of Torymidae have been found in the fruits of *F. citrifolia*, which according to Grissell (1979), are probably mostly parasitic on the *Pegoscopus*. Two species of *Neosycophila*, two species of *Physothorax* (same species as in *P. jimenezi*) and *Colyostichus brevicaudis* Mayr 1885 are the insects involved in this association. Burks (1969) described a species of Eurytomidae, *Sycophila butcheri*, from the two native fig species.

4. *Pegoscopus jimenezi* Grandi. Originally described from Costa Rica, this wasp has as its natural host in Florida, the monoecious fig *Ficus aurea*. In the Miami area this species was also found in syconia of the dioecious species *Ficus septica*. This exotic fig species was first observed to have wasps and viable seeds as early as 1975 (Piatos & Knight, 1975), but the actual pollination mechanism is unknown in Florida. In *Ficus aurea*, *Idarnes carme* Walker 1843 (Torymidae), *Sycophila butcheri* Burks (Eurytomidae), and three species of *Physothorax* (Torymidae) have been identified from the fruit.

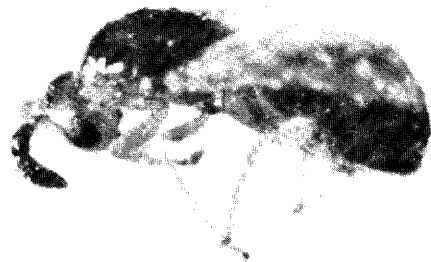


Fig. 8. Female *Odontofroggatia galili*
(DPI Photo #87080)



Fig. 9. Male *O. galili*
(DPI Photo #87080)

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