NEW RECORD OF THE FIG WASP *BLASTOPHAGA QUADRATICEPS* MAYR WITH REMARKS ON THE INTRODUCTINO OF THIS INSECT TO IRAQ AND ON THE *DISPERSAL OF ITS HOST PLANT FICUS RELIGIOSA L.*

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The fig wasps are microscopic Hymenoptera belonging to the families Agaonidae, Torymidae (Callimomidae) and Eurytomidae. They breed in the ovaries of the flowers inside the syconia (receptacles) of more than 700 species of *Ficus* (Moraceae) found mostly in the tropical regions of the world. The well known inter-relationship (symbiosis) of the true fig wasps (Agaonidae) and of their host plants (species specific *Ficus*) is a good example of plant-insect mutualism and inter-dependence. In return for a milieu for breeding and food for the development of their immature stages offered by the host plants inside their syconia, these fig wasps bring about cross—pollination permitting the development of fertile seeds.

The present paper deals with a new record of a species of *Blastophaga* breeding in the syconia of *Ficus religiosa* L. in Basrah and with remarks on the manner in which the insect might have been introduced into Iraq and on the role of certain syconia feeding birds in the dispersal of the plant.

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Ten mature syconia (just starting to ripen) of *F. religiosa* were collected periodically from five different localities in Basrah from October 1979 through March 1980. Each collection of syconia was kept in a separate glass jar (6 inches height × 4 inches diameters). The mouth of the jar was closed with a layer of thin muslin cloth and fastened by means of a rubber band. Within about two days of each collection, emergence of female fig wasps usually took place. On the third day after the first emergence of female wasps in each jar, the syconia of each collection were dissected to remove the male fig wasps which usually do not come out of the interior of the syconium. The female and male wasps collected were preserved in 70% alcohol for identification and further study.

The number of annual generations of syconia that developed on the *Ficus religiosa* trees (from which the collections of syconia were made) and the number of generations of wasps that developed in these (generations of syconia) were noted.

The type of birds regularly visiting the above mentioned *F. religiosa* trees for feeding during the periods of peak abundance of ripe syconia were also noted.

The spring, summer and winter syconia of *F. religiosa* trees growing in Baghdad were collected (1979-80) and examined for the presence or absence of fig wasps and for the development of fertile seeds in them.

1. *Identification of the Fig Wasp* :

The wasps collected from the syconia of *F. religiosa* in Basrah were determined as *Blastophaga quadraticceps*

Mayr (1885) and confirmed by comparison with the description given by Grandi (1923) based on fig wasps collected from the syconia of *F. religiosa* from Ceylon (Sri Lanka). The female wasps is about 1.5 mm io length ; the male is worm-like and about 1.8 mm in length.

It was noted that none of the parasites or inquilines recorded by earlier authors (Westwood, 1883 ; Joseph, 1953, 1956 ; Wiebes, 1967 ; Abdurahiman & Joseph, 1975) along with *B. quadraticeps* from the syconia of *F. religiosa* in Ceylon and India were met with among the fig wasps that emerged from the collections of syconia maintained in the laboratory all through the period of this study.

2. The breeding of *B. quadraticeps* in Basrah.

Three annual generations of *B. quadraticeps* have been observed developing in three annual generations (spring, summer and winter) of *F. religiosa* syconia in the Basrah area. During the year 1979-80 the mature and ripe syconia were most abundant in March (Winter generation) and May (summer generation).

3. *Birds feeding on ripe syconia of F. religiosa in Basrah* :

During the above mentioned periods of peak abundance of ripe syconia, large numbers of the Mesopotamian Bulbul (*Pycnonotus leucotis mesopotamiae* Ticehurst), House Sparrows (*Passer domesticus Linn.*) and some Collared Doves (*Streptopelia decaocto* Frivaldszky) were observed to make several sorties to the *F. religiosa* trees both in the morning and afternoon and to feed on the syconia.

Discussion and Conclusions :

1. The observation that the fig wasp *B. quadraticeps* breeds in the receptacles of *F. religiosa* in Basrah is a new record for Iraq as well as for the entire Arab Gulf Region. The earlier records of this insect are from Ceylon (Westwood, 1883 ; Grandi, 1923), Singapore (Mayr, 1885), India (Joseph, 1953) and from some West Asia Countries (Galil and Eisikowitch, 1968).

In the Indo-Malayan region of Asia (considered to be the original home of *F. religiosa*), as already stated above, several parasites and inquilines have been obtained from *F. religiosa* syconia along with *B. quadraticeps*. But in Iraq (Basrah) and some other Middle East Countries where this plant has been introduced, only the agaonid pollinator has been able to establish. This selective distribution of *B. quadraticeps* but not of its parasites and inquilines remains unaccounted for.

2. *F. religiosa* is an excellent garden and avenue tree and so has been introduced into Iraq, especially in Baghdad and Basrah. Although the Baghdad trees regularly bear syconia, as the wasp *B. quadraticeps* does not breed in their syconia, no pollination is brought about and no fertile seeds are produced. The inability of this wasps to breed in the syconia of the Baghdad trees is most probably due to the lower winter temperature there as compared with Basrah.

3. It is known that F. *religiosa* was introduced into Iraq through cuttings. Most probably *B. quadraticeps* could have entered Iraq as wasp larvae developing inside the ovaries of phase C (interfloral) syconia (Galil &

Bisikowitch, 1968) on the branches used as cuttings. In places like Basrah where the environmental conditions were favourable for the completion of their life-cycle, these wasps bred successfully and established themselves.

4. The role of birds in effecting the dispersal of the seeds of various plants is well known. Indeed, several species of birds are to a great extent responsible for the dispersal of the seeds of *F. religiosa* and *F. benghalensis* in the Indo-Malayan region (Ridley). According to Chakravarty (1976), "the ripe syconia of both these species of *Ficus* are eaten by crows and other birds and the seeds germinate well when they pass through the alimentary canal of the birds and hence they are often found germinating as epiphytes upon other trees or on old buildings where the droppings of the birds fall". In fact, several cases of *F. religiosa* growing in similar situations have been observed in Basrah by the present author.

It is reasonable to state that the ripe syconia of *F. religiosa* contribute an important item of food (during periods when they are aboundant) for the birds mentioned earlier. Naturally vast quantities of the seeds of this plant pass through the alimentary canal of such syconia-feeding birds. What is the benefit that these seeds derive as a result of their passage through the alimentary canal of such birds ?

In the case of the seeds (with very thick endocarp) of the sapotaceous tree *Calvaria major* of Mauritius, Temple (1977) concluded that only those seeds that were ingested by the extinct bird Dodo (*Raphus cucullatus*) and which through their passage through the alimentary canal, were sufficiently abraded and scarified by the gizzard of

the bird, were capable of germinating. It is therefore reasonable to suppose that the seeds of *F. religiosa* that are ingested and pass through the alimentary canal of birds are acted upto by the gizzard and also possibly by the digestive enzymes of these birds. This process might make their seed coat thinner and softer, thus giving them better chances of germination. Their further growth depends on the nature of the substratum on which they are deposited by the birds concerned.

Thus, besides the active role of man in the propagation and dispersal of *F. religiosa* by raising this plant from cuttings, the birds which feed on its syconia play an important but passive role in its dispersal through seeds.

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