

Fig News



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Fig News



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EDITORIAL

In the last issue we learnt that Steve Compton was moving back to England. Now Tony Ware will be taking up a research position with the citrus industry and this means that the South African fig team will be disbanding. Because of these moves this will be the last edition of *Fig News* from South Africa and Steve will be taking up the reins and assuming responsibility for its continuation from England.

Because of the increasing costs and uncertain future funding, we will have to try to limit production. Future editions will only go out to those interested parties who have returned the questionnaire or who have corresponded with us over the last 18 months. As the now sole editor of *Fig News*, Steve will be needing our help. Please provide him with articles, reprints from your recent publications, letters, conference notices, news items, etc. We would like to reiterate the objectives of *Fig News*: to provide a medium whereby those interested in fig biology can COMMUNICATE with each other.

We would like to extend our appreciation to Rhodes University for their financial support in getting this venture off the ground. Thanks to all those who have contributed thus far.

TONY WARE & STEVE COMPTON

LETTERS

SALLY ROSS writes:

As of early next year I will be a free agent, having unexpectedly (due to Steve's departure) completed a Masters degree as opposed to a PhD. Does anyone need, or know of anyone who needs, a research assistant, field assistant, voluntary worker, general dog's body.... or in fact anybody to do anything round about that time? - need a break before starting a PhD. I've been working on the community dynamics of the insect herbivores on *Ficus burtt-davyi*, a local fig species. I have a fair bit of field experience in Britain, S. Africa, Madagascar and Indonesia and would be happy to try my hand at more or less anything in order to broaden this experience! I would be very pleased to hear from anyone who has anything to offer or, failing that, any bright ideas. (Address: Department of Zoology & Entomology, Rhodes University, Grahamstown 6140, South Africa)

WILLIAM RAMIREZ B. writes:

All fig wasps (pollinators and non-pollinators, including leaf gall makers) I have studied and photographed with the electronic (sic) microscope have a gular plate instead of a postgenal bridge as noted in the book of Boucek (1988: 156). Neither a gula or a postgenal bridge is found in the pteromalid fig wasps. Thus, the Torymidae, Eurytomidae and Pteromalidae (the non-pollinating fig wasps) do not seem to be derived from a common ancestor as noted by Boucek (1988: 23). For the presence of a gula in the pollinators (Agaoninae) *sensu* Boucek (1988), see Ramirez (1991: 87).

Boucek, Z. (1988). *Australian Chalcidoidea (Hymenoptera)*. C.A.B. International, Wallingford.

Ramirez B., W. (1991). Evolution of mandibular appendage in fig wasps (Hymenoptera: Agaonidae). *Rev. Biol. Trop.* 39, 87-95.

(ANY COMMENTS Ed.)

GARY GIBSON writes:

...I am intrigued by chaos in the familial level classification of the "Agaonidae" and am trying to build a collection of fig wasps and associates at the Canadian National Collection. Although this collection is relatively small, almost all specimens are critical-point dried and thus excellent condition for taxonomic studies. Most material is from the New World tropics and from South Africa. Hopefully taxonomists will begin to borrow this material for their revisionary studies.

SHORTS

RECORD FIG-WASP FAUNAS

The chalcid fauna of *Ficus microcarpa* Linn. f. v. *microcarpa* in Hong Kong was the richest I ever encountered. From a total of 17 separate samples (in all, several thousand small figs) over the period 1961-64 I collected a total of 20 different fig wasp species. Timberlake (1922) also in Hong Kong reported collecting a total of 22 species from *F. 'retusa'*, but in those days the insect taxonomy was very confused and some fig wasps had the male placed in one genus and the female in another (and even a different family), so his total is probably suspect. I have a sample of this species in Malaya which I think contains two other wasp species. The total number of fig wasp species from *Ficus microcarpa* varieties should be prodigious. Corner recognised eight varieties spread geographically from India to China and across the Pacific.

The Great Indian Banyan (*F. benghalensis* Linn.) also has a very rich fauna. On a family visit to Calcutta in 1963 I found the single huge tree in Allpore Botanical Gardens bearing fruit and from a total of 90 figs I collected about 20 different wasp species - they were preserved in neat gin! Incidentally this is an important collection for it is topotypical in that Walker (1870's) used several insects from the identical tree as type specimens for new species.

The ancient and very widespread banyan species definitely have the most extensive fig wasp faunas, despite the figs actually being quite small in size. Any one fruit usually only contains a few species, so that a large sample has to be collected in order to determine the true wasp spectrum; but these old and widespread species mostly have a fig wasp fauna of about 20 species.

DENNIS HILL

ARTICLE

The following key for the identification of fig wasps was received from William Ramirez B.

FEMALE WASPS

1. Head longer than wide, depressed with small, not bulging eyes; antennae 11 segmented; fore tibia shorter than femur: >2.
Head shorter than wide, subhemispherical with large bulging eyes; antennae with more than 11 segments; fore tibia longer than femur: >3.
2. Mandible with one or two conspicuous flat lamellate or carinate flat appendages under head; third antennal segment without sensilla laterally projected into a process: **Agaonidae**.
Mandible without conspicuous appendage under the head; third antennal segment with normal sensilla: **Sycoecinae**.
3. Gular plate absent; oral fossa not reaching the foramen magnum: **Pteromalidae**.
Gular plate present; oral fossa not reaching the foramen magnum: >4.
4. Mandible tridentate with three glands; antennae usually with more than 13 segments with 3 small anelli; body with green or blue metallic gloss or blackish: **Otitesellinae**.
Mandible bidentate with two glands; antenna 12 or 13 segmented with 0, 1 or 2 anelli: >5.
5. Occipital carina present; metasoma ovoid: >6.
Occipital carina absent; metasoma not ovoid: >7.
6. Ovipositor much longer than body, body metallic green; anelli present: **Torymidae**.
Ovipositor internal, not visible from the outside; body yellowish or blackish; anelli absent (sometimes one anellus): **Epichrysomallinae**.
7. Body yellowish; ovipositor short, coiled inside; metasoma laterally compressed: **Eurytomidae**.
Ovipositor long; metasoma dorsoventrally depressed: >8.

8. Metasoma normal; the ovipositor formed by the valvulae only:
(Sycophaginae) > 9.
Metasoma apparently ends with the 8th or 9th tergite; valvulae partially or
totally covered by 1 or 2 tergites: (Sycoryctinae) > 10.
9. Metasoma normal not plough-share shaped: Sycophaginae.
Metasoma plough-share shaped: Apocryptini.
10. Last (9th) metasomal tergite tubularly lengthened partially covering the
valvulae almost to the tip: Sycoryctini.
Last two (8th and 9th) metasomal tergite tubularly lengthened partially
covering the base of the valvulae: Philotrypesini.

MALE FIG WASPS

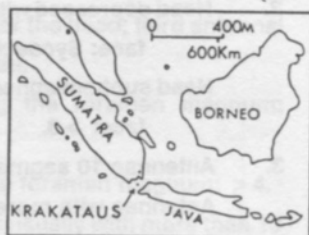
1. With wings: > 2.
Without wings or brachypterous: > 5.
2. Head depressed with sickle-like long mandibles; antennae inserted low on
face: Sycoecinae.
Head subhemispherical with short mandibles; antennae insertion high on
face: > 3.
3. Antennae 10 segmented; anelli absent: Epichrysomalidae.
Antennae with more than 10 segments; anelli present: > 5.
4. Body metallic green, hind coxa larger than others; end of metasoma
normal: Torymidae.
Body yellow, end of metasoma up-turned: Eurytomidae.
5. Body not depressed; U-shaped¹, metasoma tube-like, projecting under the
body: Agaonidae.
Body not depressed, not U-shaped; metasoma normal: > 6.
6. Brachypterous² with oversized head, mandibles and scapes; antennae
inserted high on face; anterior end of pronotum shielding the base
of the head: Otitesellinae.
Apterous with normal head, mandibles and scapes; antennae inserted
near mouth; anterior end of pronotum not shielding the head: > 7.
7. Head subquadrangular, as long as wide, with moderate sized mandible³;
body not tubular; metasomal peritremata⁴ small: (Sycoryctini) > 8.
Head subcylindrical, longer than wide with small mandibles; tubular body⁵;

large metasomal peritremata: (Sycophaginae) > 9.

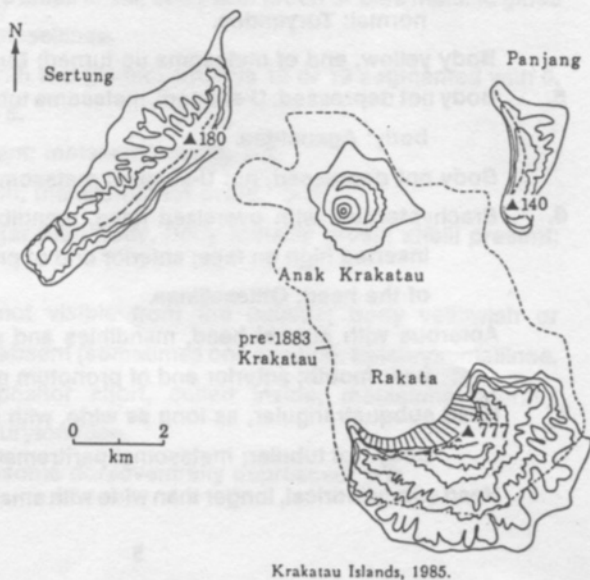
8. Epistomal margin deeply emarginate: **Philotrypesini**.
Epistomal; margin not deeply emarginate: **Sycoryctini**.
9. Metasomal peritremata large; subcircular plate-like, antennae with less the 5 segments: **Apocryptini**.
Metasomal peritremata filamentous; whip-like, antennae with more than 5 segments: **Sycophagini**.

¹ Hooked; ² Hogbacked soldier; ³ Soldier; ⁴ Peritremata: sclerotic plate about any spiracle; ⁵ *sensu* Murray (1990: Anim. Behav. 39, 434-443)

**FIGGING ON
ANAK KRAKATAU,
INDONESIA - 1992**



My feet having barely touched ground following our (Rhodes fig team) escapade in Madagascar, I was off again within a week to explore the figgy world of the Far East. My destination was the Krakatau Islands off the west coast of Java, Indonesia. I met Steve Compton in Singapore and a few days later we joined the main expedition



Krakatau Islands, 1985.

led by Prof. Ian Thornton from La Trobe University, Australia. There were 14 of us in the team: nine from Australia, two from S. Africa and three from Indonesia.

There are four islands in the archipelago. Three of them (Rakata, Panjang and Sertung) were sterilized by the world-famous eruption of Krakatau in 1883 and have been undergoing colonisation ever since. As a result they are covered by well-developed secondary forest.

Anak Krakatau, on the other hand, only emerged from the sea in 1930 and suffered a sterilising eruption in 1952. Its flora and fauna are therefore, at most, 40 years old.

The expedition was based on Anak, most of the work being concentrated there. The odd rumble and puff added that little extra bit of excitement every now and then! Many different aspects of the recolonisation were studied, in our case the figs of course.

The vegetation on Anak is confined to the lower ground and occurs in a narrow band along the NE coast, covering only about 10% of the island. The more recently vegetated northern foreland is *Casuarina/Saccharina*-dominated with *Ficus* gradually moving in. The older vegetation of the eastern foreland, though, is dominated by *Ficus* and *Macaranga*, although *Casuarina* and *Pandanus* are also major constituents.

A thorough survey of Anak revealed four species of fig in fruit: two long-established and two new records. Our investigations were centered on the two dominant species, *Ficus septica* and *Ficus fulva* (both dioecious), of which about 80 and 200 respectively were in fruit. We found both trees to be only partially pollinated (*F. septica*, 79.1% and *F. fulva*, 22.5%), indicating a lack of pollinating wasps on the island due either to a lack of male wasp-producing trees or merely to insufficient arrivals from the other islands.

Sex ratios of both species were almost exactly 1:1, eliminating the first possibility. The next step was to establish the pollinator status on the other islands - my job as Steve had, by now, left. I found overall, 93% pollination of *F. septica* and 97% pollination of *F. fulva*. So there are plenty of wasps around but not enough are reaching Anak yet, particularly where *F. fulva* is concerned.

Obviously this is a very simplified version of the story, which will be appearing in full towards the end of the year. It was all put together in a fascinating three weeks of extremely hard slog amongst the ferocious red ants

of Anak (their favourite nest spots are *F. septica* trees)! There were one or two compensations though - living on and exploring a volcano rates pretty high among them. Not far behind were plenty of excellent boat trips between islands and a constant supply of gourmet meals miraculously produced by our three Indonesian cooks. Not quite so appealing was the constant supply of very cheap Indonesian booze - whisky at <US\$3.00 a litre!!

Last, but certainly not least, the Indonesians are great people and their country too - I'll be back there at the drop of a hat!



SALLY ROSS

RESEARCH PROFILES

Prof U.C. ABDURAHIMAN: Fig-related Bibliography

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2. 1967b. Abdurahiman, U.C. and Joseph, K.J. Contributions to our knowledge of fig insects from India. II. New fig insects from Delhi and correction of a mistaken identification. *Bull. Ent.* 8, 48-57.
3. 1968. Abdurahiman, U.C. and Joseph, K.J. Descriptions of six new species of *Decatoma* (Chalcidoidea: Eurytomidae) from *Ficus benghalensis*. *Oriental Insects* 2, 63-87.
4. 1969. Joseph, K.J. and Abdurahiman, U.C. Further descriptions of new fig wasp insects from *Ficus benghalensis*. *Oriental Insects* 3, 37-45.
5. 1975a. Abdurahiman, U.C. and Joseph, K.J. Three new Chalcidoidea (Hymenoptera) from India. *Oriental Insects* 9, 99-109.
6. 1975b. Abdurahiman, U.C. and Joseph, K.J. New fig insects from India. Three new Torymids parasitic on agaonids. *Entomophaga* 20, 73-80.

7. 1976a. Abdurahiman, U.C. and Joseph, K.J. Three new Torymids from *Ficus arnottiana*. *Oriental Insects* 10, 541-552.
8. 1976b. Abdurahiman, U.C. and Joseph, K.J. Observations on the biology and behaviour of *Ceratosolen marchall* Mayr (Agaonidae). *Entomon* 1, 115-122.
9. 1978a. Abdurahiman, U.C. and Joseph, K.J. Biology and behaviour of *Apocrypta bakeri* Joseph (Torymidae), a cleptoparasite of *Ceratosolen marchall* Mayr (Agaonidae). *Entomon* 3, 31-36.
10. 1978b. Abdurahiman, U.C. and Joseph, K.J. The bionomics of fig Chalcidoidea (Agaonidae and Torymidae: Hymenoptera). *F. Anim. Morph. Physiol.* 25, 14-26.
11. 1978c. Abdurahiman, U.C. and Joseph, K.J. Cleptoparasitism of the fig wasps (Torymidae: Chalcidoidea) in *Ficus hispida*. *Entomon* 3, 181-186.
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13. 1980. Nair, P.B. and Abdurahiman, U.C. Description of the male of *Sycoscapteridea longipalis* (Joseph) (Torymidae: Hym.). *Entomon* 15 81-82.
14. 1980. Abdurahiman, U.C. Observations on the oviposition behaviour in *Philotrypesis pilosa* Mayr (Torymidae). *Proc. Symp. Env. Biology Trivandrum*. pp. 146-150.
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17. 1981. Joseph, M. and Abdurahiman, U.C. Oviposition behaviour of *Ceratosolen fusciceps* Mayr (Agaonidae) and the mechanism of pollination in *Ficus racemosa*. L. *J. Bombay Nat. Hist. Soc.* 15, 433-442.
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19. 1984. Joseph, K.J. and Abdurahiman, U.C. Agaonid-*Ficus* interactions with special reference to pollination ethology. *Proc. Indian Acad. Sci. (Anim. Sci.)* 93, 365-372.

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22. 1987. Joseph, K.J. and Abdurahiman, U.C. Biosystematics of fig wasps (Chalcidoidea). *Proc. Indian Acad. Sci.* 96, 533-542.
23. 1987. Nair, P.B. and Abdurahiman, U.C. Ethological adaptations of *Kradibia gestroi* (Agaonidae) for pollination and oviposition. In *Recent Trends in the Ethology of India* (Eds Balakrishnan, M. and Alexander, K.M.). pp. 88-94.
24. 1990. Narendran, T.C. Abdurahiman, U.C. and Sumodan, P.K. Two new species of *Ormyrus* Westwood (Ormyridae) from India. *Geobios New Reports* 9, 114-117.

U.C. ABDURAHIMAN: Interests:

Taxonomy, biology and behaviour of fig wasps, adaptations of fig wasps, insect plant interaction and co-evolution involved in the *Ficus*-wasp association and pollination ethology. Also been involved in the bionomics of the parasitoid hyperparasitoid complex of *Opisina arenosella* and *Orthaga exvinacea*, the caterpillar pests of coconut and mango trees.

KATHARINE MILTON: Fig-related Bibliography

1. 1979. Nagy, K. and Milton, K. Aspects of dietary quality, nutrient assimilation and water balance in wild howler monkeys. *Oecologia* 30, 249-258.
- ✓ 2. 1982. Milton, M., Morrison, D.W., Estribl, M.A. and Windsor, D.M. Fruiting phenologies of two neotropical *Ficus* species. *Ecology* 63, 752-762.
3. 1987. Milton, K. and Jeness, R. Ascorbic acid content of neotropical plant parts available to wild monkeys and bats. *Experientia* 43, 339-342.
4. 1990. Milton, K. Pectin content of neotropical plant parts. *Biotropica*, 23, 90-92.
- ✓ * 5. 1991. Milton, K. Annual patterns of leaf and fruit production by six Neotropical Moraceae species. *J. Ecol.*

KATHLEEN MILTON: Interests:

Phenology, nutrient content, 'defensive' compounds, role in diet of any organism and evolution related to *Ficus*. Other interests include the diet and digestive phymology - part primates, parasite host interactions - primates and tropical forest composition, phenology etc.

RECENT PUBLICATIONS

Bronstein, J.L. (1992). Seed predators as mutualists: ecology and evolution of the fig/pollinator interaction. In *Insect-Plant Interactions* (Ed. Bernays, E.). CRC Press Inc. Boca Raton. pp. 1-44 (Probably the most important review of fig biology since Janzen 1979).

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del Amo, J.B. and Picazo, I. (1992). In vitro propagation of *Ficus benjamina* cv. starlight from axillary buds with BAP and Phloroglucinol. *Gartenbauwissenschaft* 57, 29-32.

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- Zheng-Song, Z. (1992). A new species of *Metatachardia* (Chamberlin) from Yunnan, China (Homoptera: Tachardidae). *Oriental Insects* 26 383-385. (Found on *F. benjamina*)
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