

Dr. Howard called for a few remarks from Dr. Fox, who, as mentioned in the paper just read, made the interesting discovery that the decapitated heads of these ants were infested by Dipterous larvæ. Dr. Fox, in responding, congratulated Mr. Pergande for having worked out the life history of this parasite. Mr. Ashmead said he considered Mr. Coquillett fully justified in erecting a new genus for this fly, whose peculiar structure was undoubtedly correlated with its mode of life, so different from that of other members of the family Phoridae. Specimens of this fly were then passed around for the inspection of the members.

The paper by Mr. Schwarz, then presented, was entitled :

#### A SEASON'S EXPERIENCE WITH FIGS AND FIG-INSECTS IN CALIFORNIA.

By E. A. SCHWARZ.

The successful introduction of the Fig-insect (*Blastophaga grossorum*) into California by Dr. L. O. Howard and Mr. W. T. Swingle, of the U. S. Department of Agriculture, in the spring of 1899, was followed in the year 1900 by a season of practical experience and experiment at Fresno, Cal., which resulted in the production of the first large crop of real Smyrna figs (*i. e.*, figs with fertile seeds) ever produced in America, the figs being of a quality equal, or even superior to the figs imported from Asia Minor. It was then demonstrated beyond any possible doubt that the intervention of the *Blastophaga* is absolutely necessary to a production of a large crop of Smyrna figs (a few hundreds or even thousands of figs can be successfully matured by the laborious process of pollinating the figs by means of a blow-pipe). That there was a chance of demonstrating this fact on a large scale in America is solely due to the courage and foresight of Mr. Geo. C. Røding, of Fresno, Cal., who, alone of all the Californian orchardists, kept up, at great expense, for more than ten years, an extensive orchard (about 62 acres) of Smyrna fig trees without deriving the slightest profit from it.

#### THE SMYRNA FIG TREES.

The annual cycle of the life history of the *Blastophaga* proves to be a very simple one, but appears to be greatly complicated to any one who has no knowledge of the natural history of the Smyrna fig tree. The latter subject deserves to be more thoroughly studied than has hitherto been done, and offers to a competent student a wide field for important and novel observations.

It is now generally conceded that the female fig tree bears only two crops of figs each year. Regarding the male tree (Caprifig tree), even the most recent botanists maintain that there are three crops, although it is usually stated that there is no sharp distinction between the figs of the second and third crops. In the three varieties of Asiatic caprifig trees represented in Mr. Røeding's orchard\* it was found to be impossible to distinguish more than two crops both as to mode of growth as well as construction of the figs—a spring crop (profichi figs), and a fall crop (mammoni figs); the so-called third crop (mamme figs), consisting merely of late individuals of the second crop which remain on the trees during the winter *solely because they are inhabited by the Blastophaga*.

#### THE CROPS OF THE CAPRIFIG TREE.

The spring crop of the Caprifig, which develops on the previous year's growth, is extremely vigorous both in the size and number of figs; it is characteristic of a male tree. *i. e.*, the figs contain, besides gall flowers (in which the Blastophaga undergoes its transformations), a large number of male flowers, which produce an abundance of pollen. Abnormal figs appear to be very rare in this crop. Occasionally one is found in which the male flowers are entirely missing (in Røeding's Capri No. 2); and one variety of Capri trees (Capri No. 1) produced a small number of figs which most probably contain a large number of female flowers.†

The fall crop of the Caprifig develops on the new growth; it is extremely weak and inconspicuous in comparison with the spring crop. The figs are small and appear, with few exceptions, several weeks later than the corresponding crop of the female tree; they develop gradually so that at no time are there many figs on each tree; but buds continue to develop to figs as long as warm weather lasts (to middle of November or even later). Gall flowers are normally present but in much smaller number (mainly on account of the smaller size of the figs), than in the spring crop; male and female flowers are commonly met with, but their frequency and combination with gall flowers varies greatly accord-

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\*These were imported by Mr. Røeding directly from the Aidin fig district above Smyrna in Asia Minor. Their native names are unknown, and Mr. Røeding has designated them as "Capri No. 1," "Capri No. 2," and "Capri No. 3."

†The nature of these interesting figs was unfortunately misinterpreted by the writer at the time they were found (in May). They are referred to in his reports to Dr. L. O. Howard as profichi figs affected by "the ostiolum disease."

ing to the individuality of the trees and according to the varieties of Caprifig trees.\* The presence of female flowers in the Caprifigs interferes more or less with, or eventually entirely prevents the development of the Blastophaga.

Caprifig trees from which a large number of cuttings have been taken, or from which the "inside growth" has been trimmed out, are generally avoided by the Blastophaga. The same holds true of over-pruned or over-trimmed female trees.

#### THE CROPS OF THE FEMALE FIG TREE.

In the female tree, it is the fall crop (*i. e.*, that developing on the new growth) which, in vigor corresponds with the spring crop of the male tree; the crop is characteristic of a female tree in producing only genuine female flowers, which when pollinated by the intervention of the Blastophaga, secrete a large amount of saccharine matter and produce fertile seeds. Without pollination by the insect the figs drop off before they attain the size of a large cherry.

The spring crop of the female tree, *i. e.*, that developing on the previous year's growth, corresponds with the fall crop of the male tree; the flowers of the figs are, according to the botanical authorities, malformed female flowers, incapable of being fertilized even if pollen were obtainable at this season.†

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\* Røeding's Capri No. 2 produced, with few exceptions, only normal figs, *i. e.*, figs containing exclusively gall flowers. Capri No. 3 produced, besides normal figs a large number of figs containing male flowers, but the latter are never numerous, appear to be somewhat deformed, and produce only a small amount of pollen. Figs are also frequently met with which besides gall flowers and male flowers contain a smaller or larger number of female flowers. Strictly bi-sexed figs, *i. e.*, containing only male and female flowers, are very rare. Røeding's Capri No. 1 is remarkable in producing, besides normal figs, a large number of figs containing a smaller number of female flowers. Male flowers are here exceedingly rare, but figs containing exclusively female flowers are not uncommon.

† This crop is, of course, without practical importance, and the writer has neglected to study the flowers of this crop in the Asiatic varieties of Smyrna fig trees as represented in Mr. Røeding's orchard. It suffices to tell here that at least one variety (Røeding's "Commercial Smyrna") produced in June an abundance of large, edible, and sweet figs (of course without fertile seeds) comparable in quality to the best Adriatic figs. These figs could not possibly mature if the flowers were genuine female flowers. On at least one tree of the same variety the writer found in April buds of male flowers.

## THE BLASTOPHAGA AT FRESNO, CAL., IN 1900.

The winged female Blastophagas\* commenced to emerge from the winter figs on March 28, and continued to do so until the end of April. The females at once enter the young figs of the spring crop of the Caprifig trees. Under normal conditions the "outdoor" life of each individual female Blastophaga does not last longer than 5 or 6 minutes; it takes from 3 to 4 days, or from 5 to 8 days, according to the season, for the Blastophaga females inhabiting an individual fig to issue from the same; it takes about 5 weeks for one entire generation of Blastophaga to issue from the figs in which they have developed; the life duration of an individual Blastophaga averages (excepting of course in the hibernating generation) 64 days.

The first, or spring generation of Blastophaga issued from the spring crop (Profichi) of male figs between June 11 and July 5. It is well known that the female Blastophagas of this generation, when issuing from the profichi figs are covered with pollen, and that they can be used for caprification, *i. e.*, for pollinating the blossoms of the female figs by transferring the male figs onto the branches of the female tree.†

The Blastophagas thus used are of course lost for the propagation of the species, but those left on the male trees enter and oviposit in the succeeding generation of male figs which constitute the first set of the second crop (fall crop) of the Caprifig tree. This set of figs is, however, very slow to make its appearance so that there is only here and there a young fig to be seen on the Caprifig trees at the time when the bulk of the Blastophaga females emerge from the spring figs. This break in the succession of the crops of the Caprifig has been noted by all writers on the subject, but no explanation of this singular phenomenon has ever been offered. In his reports to Dr. L. O. Howard the writer has attempted to give an explanation which, in due time, will be published by the Department of Agriculture. As a consequence of this break, an enormous reduction in the number of specimens of the insect takes place normally in the second generation. At Fresno, in 1900, the number of Blastophaga females which issued from the spring figs was roughly estimated to be more than three millions of specimens (the inhabitants of about 20,000 figs); whereas, in spite of the utmost care in transferring

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\*The reader should bear in mind that the Blastophaga never lives in the female figs, and that it solely develops within the so-called "gall flowers" of the male tree.

† An account of this operation as practiced for the first time in America is published by Dr. L. O. Howard, in the Yearbook of the U. S. Department of Agriculture, for the year 1900.

figs, this number was reduced in the second generation to the inhabitants of not more than 150 or 200 figs, each of these small figs harboring, in the average, not more than about 75 specimens of *Blastophaga*.

The imagoes of this weak generation issued between August 12 and September 13, and since at that time a tolerably large number of young figs are available for oviposition, the succeeding or third generation of *Blastophaga* becomes again quite numerous in specimens.

Once more the *Blastophagas* were seen on the wing, and the larger portion of the imagoes of the third generation issued from October 5 to November 10, when the observations were discontinued, the females ovipositing in and forming a fourth generation in the latest *Caprifigs* of the season. At this time, however, the *Caprifig* trees develop only a very limited number of young figs, and many thousands of *Blastophagas* fail to find figs for oviposition.

The cold weather of the approaching winter arrests any further development of both *Caprifigs* and insects, and the *Blastophaga*, partly belonging to the third generation and partly to the fourth generation, hibernates in any of its stages.

#### THE BLASTOPHAGA AT NILES, CAL.

Nothing can illustrate more forcibly the great diversity of climatic conditions prevailing in California, than the experience obtained with the *Blastophaga* during the year 1900. Early in April of this year, some winter figs containing the *Blastophaga* were sent from Fresno to the well-known horticulturist, Mr. John Rock, who has a number of Italian *Caprifig* trees in his magnificent arboretum of fig trees at Niles, Cal., only 170 miles north of Fresno. This attempt of establishing a second colony of *Blastophaga* in California was eminently successful, but instead of the four generations annually observed at Fresno, the insect underwent only two generations at Niles. The imagoes of the first generation did not issue before the end of July, the latest date of issue being September 2.\* The ensuing second generation, observed only on a single tree,† did not mature to imagoes in the fall and will no doubt successfully overwinter.

A couple of *Caprifigs* containing insects of the first generation, were re-imported from Niles into the hot summer climate of

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\*This date has been kindly furnished by Mr. G. P. Rixford, of the California Academy of Sciences.

†This magnificent tree originally purchased by Mr. John Rock from Dalmatia as an Adriatic fig tree, has been baptis-ed by Mr. Rock, Dr. G. Eisen, and the writer as the "Endrich *Capri* tree."

Fresno on July 17, and the winged Blastophagas issued from these two figs between July 21 and July 27. Their progeny formed a second generation of which the winged females issued from the figs between September 17 and September 28. The third resulting generation did not complete its transformations the same season, but had increased to the inhabitants of at least two thousand figs and thus counteracted, in no small measure, the loss caused by the issuing of the fourth generation of the Fresno Blastophagas.

Mr. Swingle stated that one reason for the incomplete and often erroneous conclusions in reference to figs reached by the botanists was that they had depended very largely upon certain entomologists for their data. He made some remarks regarding his work with figs in Italy and North Africa. In reply to the question whether there were any parasites introduced with the Blastophaga into California, Mr. Schwarz replied that, to his knowledge, none had been introduced, but that large numbers of the fig-insects were destroyed by being caught in the webs of spiders spun commonly on the fig trees. He said it was very important that other varieties of Caprifig trees be brought in. Mr. Swingle mentioned a Nematode, *Anguillula*, which, probably living as a mess-mate, was somewhat injurious to the Blastophaga in the Old World. Dr. Stiles was inclined to consider this Nematode not as harmless as supposed, and he mentioned some allied forms of this and other genera which have been found to be quite harmful.

—The following paper was sent by Prof. Uhler for publication in the PROCEEDINGS :

**SOME NEW GENERA AND SPECIES OF NORTH AMERICAN  
HEMIPTERA.**

By P. R. UHLER, LL. D.

Div. MYODOCHINA.

*Dycoderus*, new genus.

Closely related to *Ptochiomera* Say. Head thick sub-conical, hairy and including the eyes, about as wide as the anterior lobe of the pronotum; antennæ very thick, the apical joint thicker than the others, about twice as long as the third, the second longest, thinnest, tapering towards the base, the basal joint stout, shorter than the front, subfusiform; eyes globular, placed below the line of the convex front, the front broad, tu-