

## Some Observations on the Variation in Wing Venation in the Mycetophilidae (Diptera)

F. R. Shaw

Wing venation has been greatly used in the separation of Mycetophilidae. Such characters are used in distinguishing these flies, in some cases even to the species.

It has been recognized that some of the veins vary. Thus Edwards (1925) recorded the absence of the vein  $R_4$  in the following genera: *Diomomus*, *Empalia*, *Polylepta*, *Monoclona*, *Mycomyia*, *Sciophila* and *Tetragoneura*. The presence of the vein  $R_4$ , thus forming a small cell in the radial field, had been the most commonly used character in placing these genera in the subfamily Sciophilinae. Edwards recognized that the vein  $R_4$  was variable in position and presence. Hence he united all of the genera of Sciophilinae of Johannsen together with those members of the Mycetophilinae having the wing microtrichia irregularly arranged as the Sciophilinae of Edwards.

While making some identifications of these insects, certain variations in wing venation, within a single species, were noted. These seem worthy of record since, as previously stated, venation has been commonly used as a means of recognition.

The observations were made on three different species and two genera of gnats. Each will be discussed separately.

### Variation of the Subcostal Vein in MYCOMYIA OBLIQUA Say

The examination of a series of *M. obliqua* was initiated by the discovery of a specimen having the subcostal vein ending in  $R_1$ . According to Johannsen's key (1910:166), the specimen would run to *Mycomyia littoralis* Say. However, on the basis of genitalic characters, the specimen proved to be *M. obliqua*.

A series of slide mounts of *M. obliqua* was made. All were checked by genitalic characters. A study of the wing venation was made. The various ratios obtained were determined with the aid of an ocular micrometer having a movable scale. In addition to the wing characters commonly used, the relative lengths of the prothoracic basitarsus and tibia were determined.

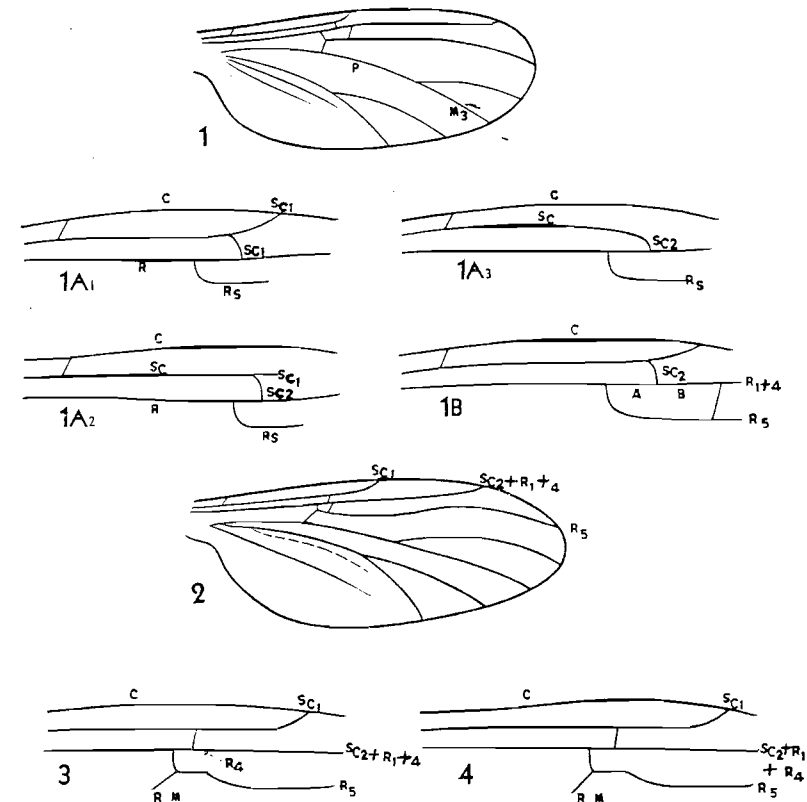
The characters studied included the following: 1) Termination of the subcostal vein. Sc may end in the costa, free, or in  $R_1$  as indicated in fig. 1 A, (1), (2), (3). Termination of  $Sc_2$  in respect to cell  $R_1$ . In this genus the termination of  $Sc_2$  has been used as a specific character. In order to make accurate observations, the distance from the origin of  $R_5$  to the termination of  $Sc_2$  (fig. 1B(a)) was determined. The distance from  $Sc_2$  to  $R_4$  (fig. 1B(b)) was also made. A ratio of 6:12 as indicated in table of data would indicate

that  $Sc_2$  entered  $R_1$  at a point  $1/3$  the distance between the origin of  $R_5$  and the point where  $R_4$  enters  $R_1 \times 2$ .

Another characteristic commonly employed has been the ratio of the length of the petiole of media to the length of the second branch of media ( $M_3$ ). In figure 1 this is represented by P and  $M_3$ .

Another characteristic is the branching of cubitus in regard to the proximal end of the r-m crossvein.

The final characteristic to be studied was the comparative lengths of the prothoracic tibia and basitarsus:



Figs. 1-4. 1. Wing of *Mycomyia obliqua*; 1A<sub>1</sub>. Wing showing normal ending of subcostal vein; 1A<sub>2</sub>. Wing showing  $Sc_1$  terminating as a stub; 1A<sub>3</sub>. Wing showing absence of  $Sc_1$ ; 1B. Wing showing relative length of first and second elements of  $R_1$  (A:B) as determined by the ending of  $Sc_2$ ; 2. Normal wing of *Polylepta obediens*; 3. Section of wing of *P. obediens* showing vestige of vein  $R_4$ ; 4. Section of wing of *P. obediens* showing absence of vein  $R_4$ ; 4. Section of wing of *P. obediens* showing absence of vein  $R_4$ . Illustrations by Elmer Smith.

The data obtained appeared in tabular form.

Specimen Number	Termination of subcosta	Ratio a - b	Ratio length of petiole of M to 2nd branch of M ( $M_2$ )
1	free	6 - 12	68 - 54
2	costa	7 - 13	62 - 56
3	costa	7 - 8	74 - 58
4	costa	7 - 13	76 - 53
5	free	6 - 12	73 - 55
6	radius	6 - 8	65 - 58
7	free	5 - 10	60 - 57
8	radius	9 - 11	70 - 64
9	costa	8 - 12	65 - 64
10	costa	9 - 10	70 - 55
11	costa	8 - 14	70 - 62
12	costa	6 - 7	62 - 53
13	costa	9 - 10	67 - 62
14	costa	4 - 14	72 - 60
15	costa	10 - 10	70 - 62
16	radius	10 - 8	66 - 51
17	costa	11 - 10	64 - 63
18	costa	8 - 13	74 - 51
19	radius	7 - 9	63 - 57
20	costa	8 - 11	68 - 62

It is recognized that more specimens are necessary before attempting to make any correlation of characters. However, it can be stated that considerable variation occurs in the behavior of the subcostal vein. Thus in 65% of the specimens examined,  $Sc_1$  was present ending in the costa and the specimens on wing structure would be identified as *Mycomyia obliqua*. In 20% of the specimens  $Sc_1$  was present but ended free. These would then run to *obtruncata* or *sequax* in Johannsen's key. In 15% of the specimens studied  $Sc_1$  was entirely lacking and  $Sc_2$  ends in  $R_1$ . These specimens on the basis of wing structure would be *M. littoralis*. Of course all these specimens can be separated by means of genitalic characters or other characteristics more reliable than the termination of the subcostal vein.

A second variable characteristic is the termination of the vein  $Sc_2$  in relation to the cell  $R_1$ . An analysis of the data reveals the following conditions: Five per cent of the specimens had  $Sc_2$  ending at middle of cell  $R_1$ ; 10% had  $Sc_2$  ending beyond middle of cell  $R_1$ , and 85% had  $Sc_2$  ending before middle of cell  $R_1$ . Of the last-named group, 35% ended just before middle of cell, 25% had  $Sc_2$  ending 1/3 length of the cell, and the remainder showed a variation of from 1/5 to 2/5 the length of the cell.

The ratio of the length of the petiole of media to the second branch of media ( $M_3$ ) varied considerably, but with the exception of two specimens the petiole of media was distinctly longer than  $M_3$ . In the two exceptions, the petiole and  $M_3$  were subequal. This would indicate that care must be used in making observations if this character is to be employed.

The relation of the length of the prothoracic basitarsus to the tibia was sufficiently constant so that no measurements were recorded. In all instances the tibia was longer.

#### Variation of $R_4$ in POLYLEPTA OBEDIENS Johannsen

Another interesting variation was observed in *Polylepta obediens*. During the examination of a series of this species, two specimens were found with abnormal venation. Figure 2 indicates the appearance of the wing of a normal individual. Figure 3 represents the condition in which only a small stub of  $R_4$  terminating in  $Sc_2+R_1$ , remains. Figure 4 shows another condition noted in which  $R_4$  was completely lacking. On the basis of venation this specimen would run to the subfamily Mycetophilinae in Johannsen's key and the insect might have been considered to be a species of *Leptomorphus*. All specimens had genitalia typical of *Polylepta obediens*.

#### Variation in MYCOMYIA IMITANS Johannsen

A third interesting variation has been already reported by the writer (1940, Can. Ent. 72:49, fig. 8). A specimen of *Mycomyia imitans* Joh. was observed in which an added element appeared in the subcoastal field. This would doubtless be considered a supernumerary crossvein.

#### CONCLUSIONS

It is obvious from the study of *Mycomyia obliqua* Say that sufficient variation occurs in the behavior of the subcostal vein to make its use questionable as a determining specific character.

It is likewise obvious that in the case of *Polylepta obediens* Joh. the behavior of vein  $R_4$  is not constant.

It is suggested in view of the facts presented that considerable care must be observed in the use of slight variations in the subcostal and radial fields as the basis of specific determinations, at least in the subfamily Sciophilinae.

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MASSACHUSETTS STATE COLLEGE  
AMHERST, MASS.