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*The March Brown, Rhithrogena haarupi, Esb.-Peters., not Ecdyurus venosus, F. (Ephemeroptera).* By MARTIN E. MOSELY, F.E.S.

[Plates II. & III.]

It will be something of a surprise to entomologists to learn that a fly which has been well known to British trout-fishermen for nearly five hundred years is not only unrecorded in the list of British Ephemeroptera, but is, moreover, entirely unknown to scientific as distinct from fly-fishing entomology.

I refer to the fisherman's March Brown, a fly in the subimago stage which is nearly the first trout-fly in the season to attract particular attention and to have a definite period of its own.

The earliest mention in angling literature of the name March Brown occurs in Ronalds's 'Fly-Fishers' Entomology,' published in 1836. It appears again in Aldam's 'A Quaint Treatise on Flees and the Art a Artyfichall Flee Making,' which was published in 1876. In his Preface, the author of this work explains that the 'Treatise' is from an MS. some seventy years old, so that one may infer that the name was in use in 1806.

But the fly itself has been known under other names far longer than this. Isaac Walton, in the 'Compleat Angler,' first published in 1653, in his list of twelve angling patterns includes its artificial imitation as the "dun-fly," and these twelve patterns were no doubt taken from an older writing still, entitled 'A Treatyse on Fysshynge,' written about 1450 and attributed to Dame Juliana Berners. The 'Treatyse' was first circulated in manuscript until at length in 1496 it was printed and found a home in the 'Boke of St. Albans.' In this 'Treatyse' the fly appearing in March, whose imitation is to be tied with "donne wolle and the winges of the pertryche," is surely the March Brown.

The first attempt to deal scientifically with the angler's flies was made by Alfred Ronalds in 1836, when, as mentioned above, the 'Fly-Fishers' Entomology' was published. Here he gives the name of the March Brown as *Baëtis* without attempting to supply a specific name.

In 1856, after Ronalds had migrated to Australia, a fifth edition was published, edited by a gentleman calling himself "Piscator." Piscator, with less entomological knowledge than that of Ronalds, but a better opinion of it, supplies the specific name *longicauda*, thus erroneously associating the fly with Stephens's species. There is no doubt that this was the first step in the confusion of the March Brown with *Ecdyurus venosus*, F.

To continue with our history, Eaton, in 1871, when working on his monograph of the Ephemeridæ, transferred *Baëtis longicauda* to the genus *Heptagenia* and subsequently, in his Revisional Monograph, 1883, to *Ecdyurus*; in this work he united *longicauda* and *venosus* as one and the same, a view which Mr. K. G. Blair, in the Ent. Month. Mag. 1930, shows to have been incorrect.

In Halford's 'Dry Fly Entomology,' published in 1897, the March Brown appears for the first time in angling literature as *Ecdyurus venosus*, a determination confirmed by Eaton himself, and all subsequent authors dealing with trout-fishing Entomology have followed in Halford's footsteps.

Some while ago I asked Professor Poulton if he would allow me to examine the Ronalds Collection now in the Hope Department of the Oxford University Museum, as I wished to see to what extent it was possible to determine the complete collection. Eaton had studied the Ephemeroptera in 1871, but had not concerned himself with the other orders represented. Professor Poulton very kindly placed the collection at my disposal, and, in the course of my

examination, I failed to reconcile the single example represented of the March Brown, probably taken on the Staffordshire Blythe, with the figures and description of *Ecdyurus venosus*. Mr. Blair, who very kindly assisted me in this examination, at once suggested that it might possibly be the subimago of a Devonshire insect he had recently described in the imago stage as *Rhithrogena fradageleyi*. This species was represented by the one ♂ imago, while in the Ronalds Collection there was only a single ♂ subimago; for the moment, therefore, we were unable to establish the relationship between the two forms. But the discovery of this undescribed subimago induced me to make a careful search through the mass of material sent me by angling correspondents over a period of more than twenty years and also in the late F. M. Halford's collection which is in my possession.

During the course of the search, I found a tube filled with subimagines similar to the Ronalds example from the Teme, Tenbury, March 1914, two single ♂ imagines, British, but with no localities or dates attached, somewhat similar to *R. fradageleyi*, but which I preferred to consider as *R. ussingi*, Esb.-Peters., and, finally, Mr. Blair, who had been assisting, discovered that the contents of a bottle labelled "March Brown, R. Tweed," containing a great mass of material, consisted almost exclusively of the Ronalds form, and he also found a Halford microscope preparation (in formalin) of a March Brown from the Tweed, which appeared to be the actual model for the figure appearing in 'Dry Fly Entomology' on p. 34, and which was not *Ecdyurus venosus* as labelled, but the *Rhithrogena* species.

Unfortunately, there were no imagines from the Tweed, and I therefore decided to pay a visit to this river, in the hope of arriving at a definite solution of the problem.

During April 1931, at Innerleithen below Peebles, the March Brown appeared on the water in tens of thousands and I collected some thirty or forty, and kept them alive in boxes to await the final transformation to the imago—or, as the fishermen term it, the spinner stage. Owing to the strong cold winds prevailing during the whole of my visit, I did not see a single imago in the open air. But my boxes produced an ample supply of both sexes in the adult stage, and I was able to confirm that the Tweed insect, and incidentally the Blythe(?) example in Ronalds's Collection, really belonged to the genus *Rhithrogena*, and not to *Ecdyurus* as had previously been considered.

A short correspondence followed with Dr. Esben-Petersen, who suggested that *R. ussingi*, Esb.-Peters., which I considered the fly to be, was identical with *R. haarupi* also described by himself but a year earlier than the former species. Dr. Esben-Petersen sent for my examination the type of *haarupi* and a co-type of *ussingi*, and I fully agree with him that they are the same, and, at his request, I sink the species *ussingi* in this paper. Dr. Esben-Petersen informed me that the subimago was entirely unknown in Denmark, where *haarupi* had been originally described.

Mr. Blair considers that his *fradgeleyi* is also identical with *haarupi*, and asks me to sink this species also, so that we have only the one species involved (*haarupi*), by which name the true March Brown must now be known.

As may be seen from the accompanying photographs of the subimagines (Pl. II.), there is much excuse for the confusion that has arisen. Although of different genera, the subimagines of *R. haarupi* and *E. venosus* are extraordinarily alike, but the neuration and the genitalia are sufficient in both sexes to separate them.

Generally, *haarupi* is seen on the water during March and April, sometimes extending into early May; *venosus* may be expected towards the middle of May and then right on through the season as late as October.

I am greatly indebted to Mr. G. E. M. Skues, of the Fly-Fishers' Club, who, in a long correspondence, kindly furnished me with the many interesting records of the March Brown that have appeared in angling literature.

### *Rhithrogena haarupi*, Esb.-Peters.

*Rhithrogena ussingi*, Esb.-Peters.

*Rhithrogena fradgeleyi*, Blair.

I find a note made on the spot of the general appearance of the living male imago as follows:—

“Head black; oculi very dark olive; thorax black; tergites deep reddish brown with olive rings between the segments; sternites olive-green with faint brownish patches, shading laterally to orange; anterior legs dark brown throughout; median and posterior legs olive, with a dark patch at the middle of each femur, tarsi dark brown; wings vitreous with a tinge of yellow at the base and along the costa; subcosta and radius orange; penis-lobes orange; setæ and forceps dark olive.”

Below I give some characters by which *R. haarupi* may be

distinguished from *E. venosus*. Neither the nymph nor the subimago have hitherto been described :—

*R. haarupi*.

Nymph (Pl. III. fig. 5).

Oculi wide, dilating laterally, with inner margins close together, thorax-markings, towards the head, two nearly longitudinal dark brown streaks, lower extremities diverging slightly outward, broadened to resemble feet with the toes directed inward and downward; below and slightly within these are two brown marks resembling inverted notes-of-interrogation; central space between the markings clear and yellowish.

Laminae of the foremost abdominal tracheal branchiæ converging and coming nearly into contact with each other beneath the abdomen; remaining laminae overlapping each other; tergites dark fuscous with two minute dots to each segment towards the centre; general appearance of the tergites uniformly brown with no pattern; terminal tergites no lighter than the anterior.

Subimago (Pl. II. fig. 1).

Cross-veinlets of anterior wing not very numerous, so that there are many long clear cells towards the centre of the wings; posterior wings uniformly coloured.

In the ♀, terminal ventral segment with excised apex.

Imago (Pl. II. fig. 2; Pl. III. figs. 6 & 7).

Wings, nervures in pterostigma simple; penis-lobes of the ♂ narrow, somewhat cylindrical; margin of last ventral segment bearing two rounded projections with a rounded excision between; abdomen without any lateral diagonal streaks.

♀, terminal ventral segment with excised apex.

*E. venosus*.

Nymph (Pl. III. fig. 8).

Oculi round, widely separated. Thorax-markings, no longitudinal streaks or marks like notes-of-interrogation, but a yellowish ground with pale brown markings arranged in a symmetrical pattern. No clear yellowish central space.

Laminae of foremost abdominal tracheal branchiæ not extending beneath the abdomen, remaining laminae somewhat oval and rather more separated than in *Rhithrogena*; tergites, light fuscous with yellowish spots arranged in a symmetrical pattern; terminal segments except the last almost entirely yellowish.

Subimago (Pl. II. fig. 3).

Cross-veinlets of anterior wings very numerous; in the posterior wings, cross-veinlets very numerous round the lower margin resulting in a heavy shading in this portion of the wing.

In the ♀, terminal ventral segment with the apex entire and acute.

Imago (Pl. II. fig. 4; Pl. III. figs. 9 & 10).

Wings, nervures in pterostigma generally forked; penis-lobes broad, turning outward to resemble inverted boots, two narrow stylets arising between them; margin of last ventral segment somewhat rounded; abdomen with lateral, diagonal, lighter-coloured streaks.

♀, terminal ventral segment with apex entire and acute.

*Rhithrogena haarupi*, Esb.-Peters., will now be added to the British list, the localities in which it has been recorded being: R. Blythe, (?) Staffordshire (*Ronalds*), March; R. Teme, Tenbury (*F. Baker*), April; R. Exe (or *Otto*),<sup>02727</sup> Devonshire (*K. F. Fradgely*), date unknown; R. Usk, Breconshire (*J. Henderson*), March-April; R. Tweed, Innerleithen (*M. E. Mosely*), April; R. Blackadder, Greenlaw (*M. E. Mosely*), April; R. Tees, Durham (*F. T. K. Pentelow*), May.

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1450. Dame JULIANA BERNERS. "An Older Form of the Treatyse of Fysshynge wyth an Angle." Satchell's 1883 Reprint from the Dennison MSS.
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1910. ESBEN-PETERSEN. "Description of a new Species of Ephemerida from Denmark." *Ent. Medd.* iii. p. 313.
1929. K. G. BLAIR. "Two new British Mayflies." *Ent. Month. Mag.* vol. lxx. p. 253.

## EXPLANATION OF THE PLATES.

## PLATE II.

- Fig.* 1. *Rhithrogena haarupi*, Esb.-Peters. Subimago, ♀.
- Fig.* 2. Ditto. Wings, imago, ♂.
- Fig.* 3. *Ecdyurus venosus*, F. Subimago, ♀.
- Fig.* 4. Ditto. Wings, imago, ♂.

## PLATE III.

- Fig.* 5. *Rhithrogena haarupi*, Esb.-Peters. Nymph.
- Fig.* 6. Ditto. Genitalia, ♂, imago.
- Fig.* 7. Ditto. Terminal ventral segments, ♀.
- Fig.* 8. *Ecdyurus venosus*, F. Nymph.
- Fig.* 9. Ditto. Genitalia, ♂, imago.
- Fig.* 10. Ditto. Terminal ventral segments, ♀.

FIG. 2.

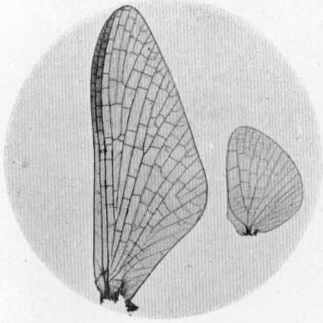


FIG. 4.

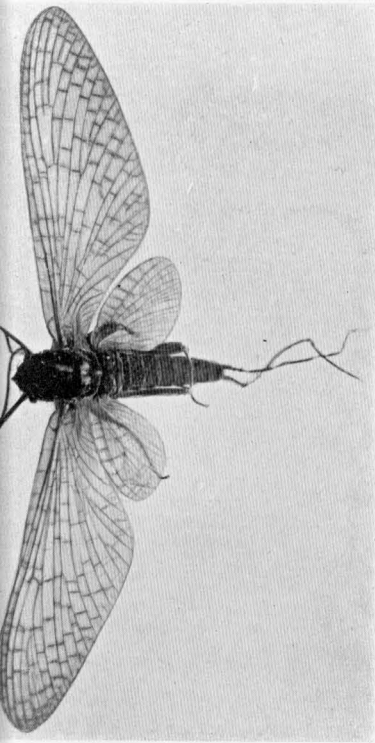
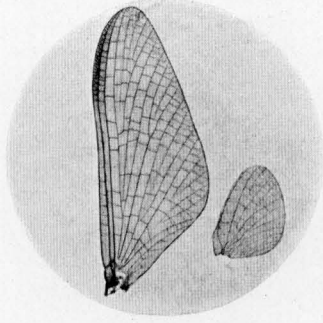


FIG. 1.

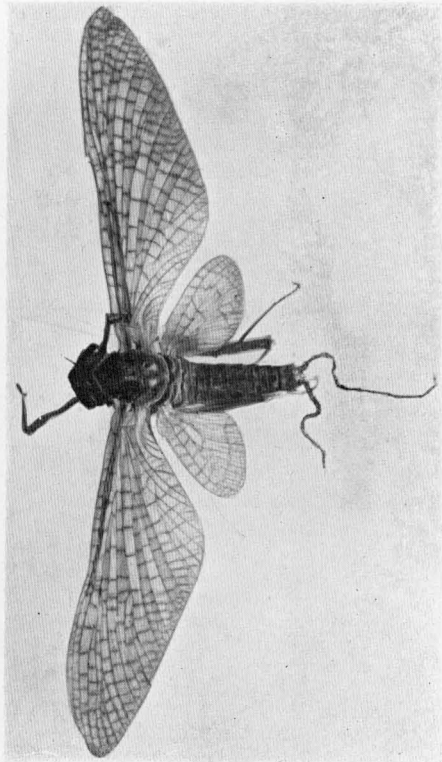


FIG. 3.

Photo M. E. M.

Subimagines and imagines of *Rhithrogena haarupi*, Esb.-Peters., and *Ecdyurus venosus*, F.

FIG. 5.

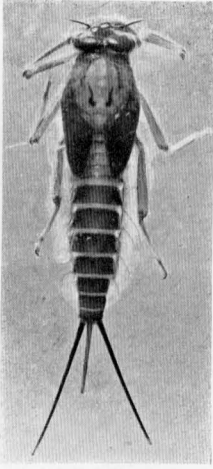


FIG. 8.

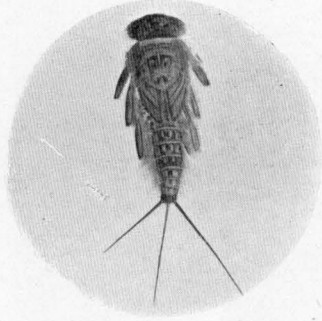


FIG. 6.

FIG. 9.

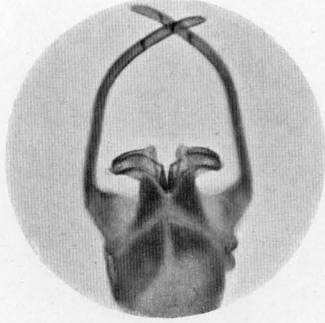


FIG. 7.

FIG. 10.

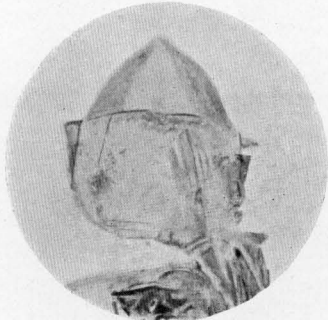


Photo M. E. M.

Details of *Rhithrogena haarupi*, Esb.-Peters., and *Ecdyurus venosus*, F.