

8. *Var. nigro-varleyata*, n.

In this form the white on the fore wings of *var. varleyata* is obliterated, the wings becoming entirely black. In the hind wings the white remains (up to now), but is reduced in area.

I have bred five or six specimens the last year or two from Huddersfield moths, but it had previously been bred by Mr. L. W. Newman from Barnsley-bred moths, and later by Mr. A. Whitaker also from Barnsley-bred moths, but I know of no specimen having been taken wild, or bred from a wild larva.

9. *Var. lutea-varleyata*, n.

In this form the white parts of *var. varleyata* are replaced by yellow of various shades.

In my own specimens bred from Huddersfield moths, the shade is a deep cream colour, but Mr. Raynor has, by crossing with *var. lutea*, obtained a stronger yellow. The finest specimen I know of is one in which the yellow is very deep, and was either captured, or bred from a wild larva, near Bradford.

10. *Var. sparsata-hazeleighensis*, n.

This form is the *var. hazeleighensis*, with the pale parts densely spotted or blotched with intense black.

I have bred several from wild Huddersfield larvae, the two finest—both large females—having the hind wings almost entirely black. I do not know the form from anywhere else.

Elm Lea, Dalton, Huddersfield.

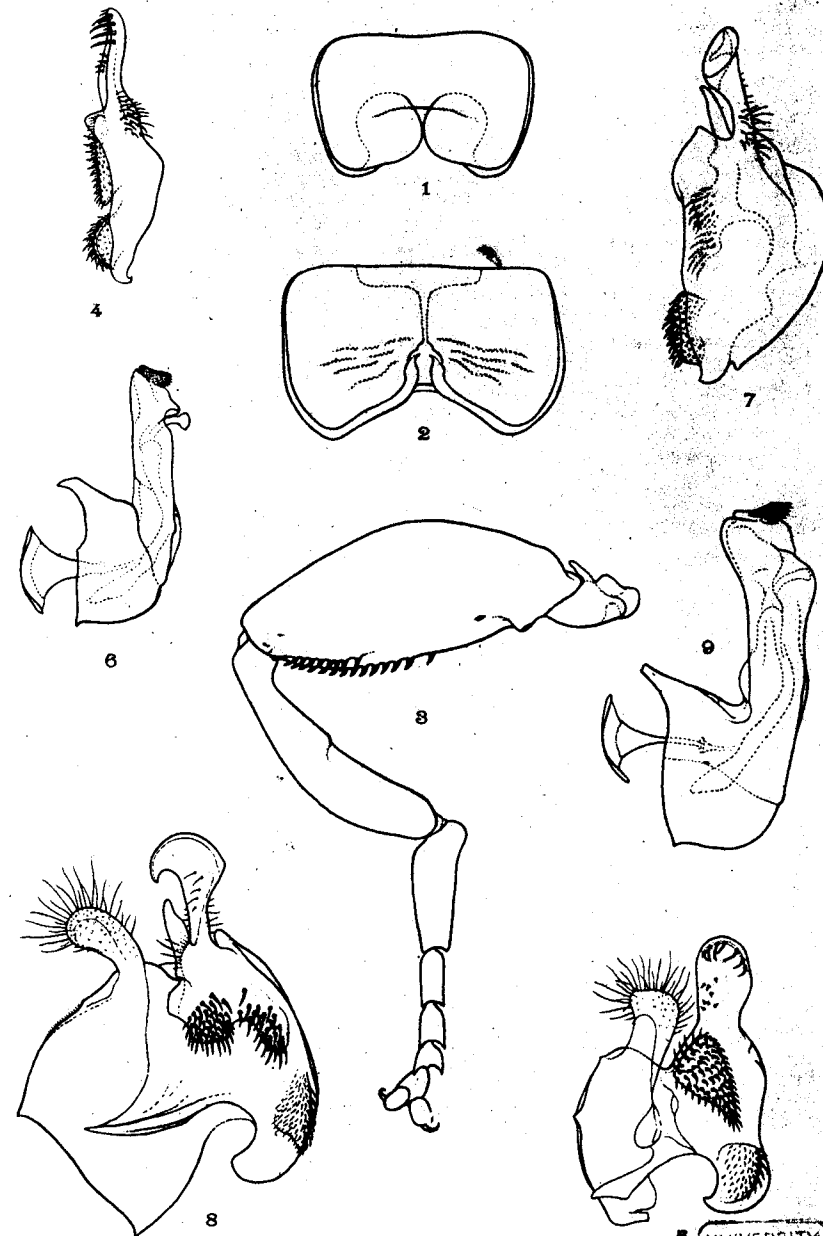
April 9th, 1920.

EUMERUS STRIGATUS FALLÉN AND *TUBERCULATUS* RONDANI
(DIPTERA. SYRPHIDAE).

BY J. E. COLLIN, F.E.S.

PLATE III.

Three British species of *Eumerus* were described by Verrall in his volume viii. of "British Flies" published in 1901, and these include one (*E. strigatus* Fall.) which has been found sufficiently destructive in the larval stage to certain plants of economic importance to be classed as an insect pest. On the Continent the larvae of what was considered to be this insect have been recorded (more usually under the name of one or other of its synonyms—*aeneus* Meq. or *lunulatus* Meig.) as living in



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onion bulbs, in the stems and tubers of potatoes; and in Narcissus bulbs. Opinions are divided as to whether the larvae are primarily responsible for the destruction of the bulbs, or whether they only attack those bulbs which have begun to decay from other causes. It is possible that both opinions may be correct in view of the discovery now brought forward that there are two species associated with the damage. In Britain the plants chiefly attacked appear to be Narcissi, Iris, and Lilies. Cases of damage to onions in this country are rare, and no records have been traced of damage to potatoes. In 1917, however, some parsnips apparently much injured by *Eumerus* larvae were sent to the Board of Agriculture from the Evesham district of Worcestershire. Mr. J. C. F. Fryer, the Entomologist to the Board, thought that these larvae were somewhat different from those found in Narcissus bulbs, so an attempt was made to rear them. This was successful, and towards the end of April 1918 the flies began to appear. An examination of the flies was undertaken by the writer, who found them absolutely identical with the *Eumerus strigatus* described by Verrall, but a critical examination of the flies bred from Narcissus bulbs resulted in the discovery that two closely allied species were represented, viz., *E. strigatus* Fallen, identical with those bred from parsnips, and the very little known Italian species *E. tuberculatus* Rondani.

This latter species was described by Rondani in 1857 (Dipt. Ital. Prodr. ii, p. 93), but does not appear to have been recognised or recorded by any subsequent writer. It so closely resembles *strigatus* that notes on the characters by which it differs will constitute a sufficient description.

E. tuberculatus Rondani.

Resembling strigatus, but hind femora with a slight rounded projection at the extreme base beneath; basal joint of hind tarsi also with a rounded, laterally compressed, projection at base beneath, somewhat hidden by the yellow pubescence. Male genitalia very different.

♂. Vertical triangle rather narrower than in *strigatus*, and not quite so shining; facial pubescence rather yellowish; third antennal joint not so deep and therefore appearing rather longer in proportion to its depth. Thorax and scutellum not quite so shining, owing to slightly coarser punctuation; on the other hand, the abdominal punctuation is not quite so coarse or dense as in *strigatus*. Thoracic and abdominal pubescence slightly shorter. Pubescence on the abdominal sternites shorter and the last visible sternite of somewhat different shape (fig. 1.). Genitalia very distinct from those of *strigatus*; in addition to being smaller in proportion to size of insect the various parts are of very different shape and armature, as may be seen by a comparison of figs. 4-6 with figs. 7-9. Hind femora, in addition to the diagnostic characters illustrated in fig. 3, rather stouter, and shorter haired, this latter character especially applicable to the posteroventral pale hairs.

♀. Frons rather narrower than in *strigatus*, and whereas in that species the front half of the frons viewed in some lights appears distinctly dusted, no dusting except on a narrow strip close to the eyes can be traced in *tuberculatus*. Thorax and scutellum with slightly coarser punctuation as in the male, and with the pubescence rather shorter than in *strigatus* and distinctly more tawny. Abdomen with shorter pubescence. The distinguishing characters of the hind legs of the male can be traced, though not so much developed.

Length 5.5-7 mm.

Numerous specimens bred by Mr. J. C. F. Fryer (together with *E. strigatus*), from larvae in Narcissus bulbs grown at Messrs. Barr's nurseries at Taplow (Buckinghamshire), and by the author from larvae attacking both Narcissus bulbs and Iris rhizomes grown by Mr. M. Bliss of Morwellam, Tavistock (Devon), and from Narcissus bulbs grown at March (Cambridgeshire). Specimens were exhibited at a meeting of the Entomological Society of London on June 5th, 1918 (Proceedings Ent. Soc. Lond. 1918, p. lxxvii).

There can be little doubt that *E. strigatus* and *E. tuberculatus*, which superficially so much resemble each other, have been included under one and the same specific name by many writers. At the same time it is quite possible that one or more of the numerous synonyms of *strigatus* may represent Rondani's species. An examination of the type specimens would appear to be the only method of settling these points.

E. tuberculatus is probably a species which has been widely spread by the importation of bulbs, for specimens have recently been received from Canada by the writer, sent by Mr. C. Howard Curran of the Canadian Department of Agriculture. It is an addition to the List of British Diptera.

With regard to the larvae, some of those from the Taplow bulbs and some from the Evesham parsnips had been preserved in spirit; and as only *strigatus* was bred from the parsnips, any larvae from the bulbs found to differ from those from the parsnips should represent the larvae of *tuberculatus*. So far as an external examination is concerned, the greyish-yellow larvae of *strigatus* and *tuberculatus* appear to resemble each other very closely. Both have the integument rather densely clothed with microscopic spines and with transverse rows on each segment of minute tubercles bearing similar but slightly larger spines. At the anal end are some large tubercles (liable to variation at least in size), arranged as follows:—The last convolution or pseudo-segment bears the largest tubercles (designated for future reference by the letter A), one on each side, the large posterior spiracular process projecting between these tubercles though slightly more dorsal in position. On each side of the

penultimate pseudo-segment, placed very slightly more dorsally than A, there is a small twin-tubercle (B), each one of the twins terminating in a cluster of 4-5 short curved spines. On the same pseudo-segment, just above each twin tubercle and consequently rather more dorsal in position, is another tubercle (C), usually larger than B but never so large as A.

In the smaller proportion of larvae from the Taplow bulbs the tubercles (C) are brownish in colour, the microscopic bristles forming the skin armature rather shorter, and the minute tubercles of the transverse rows on each segment less conspicuous. These larvae are probably those of *tuberculatus*, the others with tubercles (C) unicolorous and with the skin armature slightly more pronounced being *strigatus*. This supposition is confirmed by an examination of the larvae from the Evesham parsnips, though a complication arises by the fact that among these larvae are to be found a few which are most obviously distinct; they are whiter in colour, tubercles (C) absent, twin-tubercles (B) rather larger, the skin armature soft, hair-like, and white, and the transverse rows of tiny bristle-bearing tubercles practically indistinguishable. These are, without doubt, the larvae which led Fryer to believe that he was dealing with a distinct species. Unfortunately no insect was reared from the parsnip material to which these larvae could be referred, and they therefore remain at present a mystery.

EXPLANATION OF PLATE III.

The genitalia are shown after having been dissected in the following manner:—The aedeagus (figs. 6 and 9) has been removed, and the remaining "shell" bearing the pubescent anal lamellae and the large side-lamellae or "claspers" has been split into two corresponding and identical halves, one of which is represented in figs. 5 and 8 as viewed from the inner side.

In its natural position the aedeagus is connected to the "shell" in the following manner:—The upper margin of its basal part (indicated by the upper left-hand corner of the profile figures) is connected to a plate, which appears to be a continuation of the inner skin of the side lamellae, and which separates the closed space wherein lies the rectum from the open space between the side-lamellae where the aedeagus has free play; in addition, the base of the aedeagus is connected on each side (at a point about half-way down from the point of connection mentioned above) with that part of the outer skin of the "shell" shown as the lowest point in figs. 5 and 8. As a consequence of these attachments the end of the aedeagus comes about opposite to the bristle-bearing pads on the inner side of the lamellae.

The end of the aedeagus is naturally split (in the plane of the paper of the plate) for some considerable distance downwards into two exactly similar halves, the end of the penis lying between these two halves. Two curved

* This "plate" is shown in the figures (in a somewhat unnatural condition owing to dissection), as a more or less pointed projection running diagonally to the left-hand lower corner.