

# 同所的なケバエ科 2 種の形態における比較

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## Morphological comparison of two sympatric Bibionid fly species

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### Abstract

The large-sized Bibionid species of *Biblio rufiventris* (Dedu) and *Biblio fenebrosus* (Conquillet) are sympatric and synchronize in their outbreak. The former adult-female has pale-reddish-brown pronotum and abdomen, and differ from the latter one whose pronotum and abdomen are black. The *rufiventris* female is also bushy-haired or has a lot of long bristles in contrast to the *fenebrosus* one.

Although adult males of the two species are black all over and are not classified at a glance, they are consisted of the long-bristle individuals and the short-bristle ones. The long-bristle male is estimated to be the *rufiventris* fly. This remarkable character is useful to distinguish the two lives, quickly.

### 要 旨

ケバエ（フルカ）科の大型種であるメスアカケバエとハグロケバエは、同所的であり、発生時期も重なっている。前者の成虫雌の前胸背と腹部は、薄い赤みがかかった褐色で、全身黒色のハグロケバエと容易に区別されうる。さらにメスアカケバエの成虫雌は、体表に多くの長い剛毛を有し、全体的に毛深くみえる。ハグロケバエは、これとは異なり、剛毛は短い。

これら 2 種の成虫雄は全身黒色（翅を除く）で、一見区別がつかない。しかし、毛深く、剛毛が長いタイプと短いタイプに分けられることがわかった。毛深い方の雄がメスアカケバエと推定される。剛毛の長さによる判別は、生きているうちにすばやく分類できる有用な方法である。

### Introduction

Although *Biblio rufiventris* (Duda) and *Biblio fenebrosus* (Coquillet) are large-sized species in Bibionidae, they emerge around the same time and their larvae inhabit the similar environment. It is, also, known that they are sympatric species (Sutou, 2005).

In the deciduously riverside of Oppe river (Oppe gawa in Japanese), Takasaka, Higashi-Matsuyama City, Saitama Prefecture, the two species were collected, April, 2016. The adult female of *Bibio rufiventris* (Duda) can be distinguished from that of *Bibio tenebrosus* (Coquillett) in the body-color. The former female has the pale-reddish-brown pronotum and abdomen, except for the other black parts of body and yellowish-brown wings. On the



Figure 1. The adult females of *Bibio rufiventris*(left) and *Bibio tenebrosus*(right): the left has pale-reddish-brown pronotum and abdomen(symbol of arrow) and those of the right are black.

other hand, the latter one is black totally, besides the wings concolorous with those of the former (Yasumatsu, Asahina and Ishihara, 1956; Figure 1). The adult males of the two species are similarly colored in black all over and, therefore, the color of male-body doesn't distinguish them. Consequently, in the case that females of the two Bibionid species are found in the field or morphologically subtle differences between them are found in the laboratory, the cohabitation of them are recognized.

For biochemical or molecular analysis, in condition of being, many males have to be classified speedy and easily. A few individuals of female doesn't always help us decide between sympatric population or not (Hashimoto and Terata, 2016).The remarkably morphological difference between the *rufiventris* male and the *tenebrosus* one has to be found for rapid classification.

## Method

Alcohol-fixed 19 individuals of the Bibionid species, collected in the riverside of Oppe river(Oppe gawa), Takasaka, Higashi-Matsuyama City, Saitama Prefecture, 2016, were used to search the mark for classifying the two males. Using a binocular microscope, some characters: structure of wing(vein), head width, bristle of body, and body-color were observed or measured.

## Result

*Bibio rufiventris* (Duda) looked considerably bushy-haired in contrast to *Bibio tenebrosus* (Coquillett) in the two sexes. The bristles of the *rufiventris* species were actually longer than those of the *tenebrosus* one. The length of the longest straight-bristles on the upper side of head were measured, because a lot of long bristles on the other parts of body were curled and it's so difficult to measure accurately the length of those. Females of the two species had similarly short bristles on the upper side of head but, on the lower side, the *rufiventris* female had longer bristles (Figure 2). As a result of the maximum length of

bristle on the upper side of head, the *Bibionid* males were clearly classified into two types of the long-bristle group and the short-bristle one. Almost upper-side bristles or bristles on the compound eyes were situated among facets of those (Figure 3). In maximum length of the upper-side bristle, the long-bristle males were 0.3mm and the short-bristle males were 0.1 to 0.2mm. The length of bristle was uncorrelated with the head width as a whole (Figure 4). On the other side, in the short-bristle males, the length of bristle and the head width indicated comparatively high correlation (Figure 5).

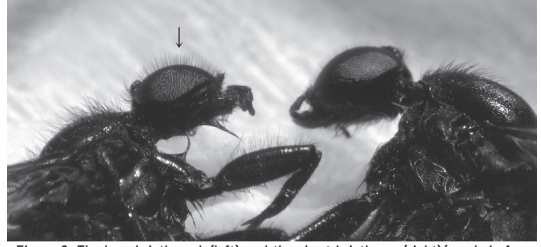


Figure 3. The long-bristle male(left) and the short-bristle one(right)(symbol of arrow means long bristles on the upper side of head).

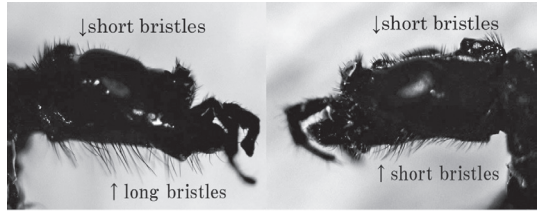


Figure 2. The heads of the *rufiventris* female(left) and the *fenestrosus* one(right).

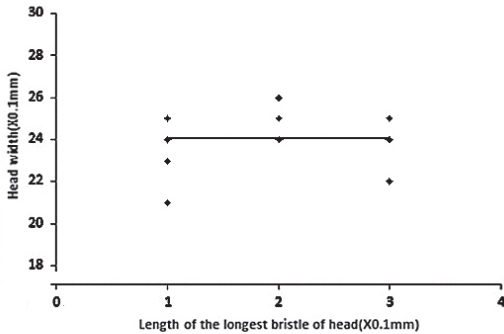


Figure 4. Relationship between head width and length of the longest bristle on the upper side of head in two *Bibionid* males(symbol ◆:individuals, the regression line:  $\hat{y}=24$  indicates uncorrelativeness).

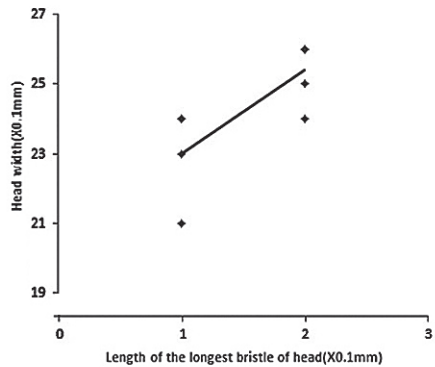


Figure 5. Relationship between head width and length of the longest bristle on the upper side of head in the short-bristle male(symbol ◆:individuals, the regression line:  $\hat{y}=2.40x + 20.6$ , correlation coefficient:0.76)

In the structure of the wing, there was not remarkable difference among females. In consequence, from the relationship between head width and bristle-length, Bibionid individuals were divided into three groups, that is, the females of the two species, the long-bristle males and the short-bristles (Figure 6).

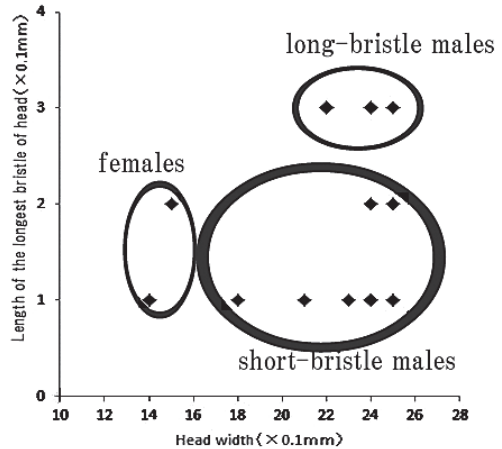


Figure 6. Relationship between head width and length of the longest bristle on the upper side of head (symbol◆:individuals)

## Discussion

The pale-reddish-brown female of *Bibio rufiventris* (Duda) has a lot of long-bristles on the surface of body, except for bristles on the upper side of head, and differ from the female of another species. This suggests that the long-bristle males are the *rufiventris* species. Males of the two Bibionid species are possible to be classified easily and speedy by using a magnifying glass, when the female doesn't appear.

## References

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